

JPRS-TND-87-003

17 FEBRUARY 1987

Worldwide Report

**NUCLEAR DEVELOPMENT
AND
PROLIFERATION**



FOREIGN BROADCAST INFORMATION SERVICE

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WORLDWIDE REPORT
NUCLEAR DEVELOPMENT AND PROLIFERATION

CONTENTS

ASIA

HONG KONG

Dissension Over, Discussion of Daya Bay Continued (Hong Kong HONGKONG STANDARD, 25 Nov, 15 Dec 86; Hong Kong SOUTH CHINA SUNDAY MORNING POST, 14 Dec 86)....	1
Partial Release of Report	1
Sand Filter System Likely, by Albert Chan	2
Safety System Scored, by Ursula Yeung	3

JAPAN

Briefs	
Fusion Technology Cooperation With EC	5

CANADA

Milk Still Showing Traces of Chernobyl Radioactivity (Ottawa THE OTTAWA CITIZEN, 12 Dec 86).....	6
Ontario Hydro Nuclear Safeguard Technology Described (Tamsin Carlisle; Toronto THE GLOBE AND MAIL, 29 Dec 86). .	7

LATIN AMERICA

ARGENTINA

Radioactive Material Spills at Airport (Buenos Aires TELAM, 12, 13 Jan 87).....	10
CNEA Shipment to Canada	10
Material Identified	10
CNEA Issues Communiqué	11
Briefs	
Nuclear Agreement With Brazil	12

BRAZIL

CNEN Secret Bank Account To Be Investigated (Sao Paulo O ESTADO DE SAO PAULO, 4 Jan 87).....	13
Impact of Possible Angra Accident on Rio Assessed (Paulo Motta; Rio de Janeiro O GLOBO, 3 Nov 86).....	14
Proposed Niobium Project Said To Endanger Strategic Metals (Sao Paulo O ESTADO DE SAO PAULO, 12 Dec 86).....	22
Briefs	
Nuclebras Burying Cans of Waste	24

MEXICO

Laguna Verde To Begin Operations in First Half of 1987 (Mexico City EXCELSIOR, 11 Dec 86).....	25
---	----

NEAR EAST/SOUTH ASIA

BANGLADESH

Health Minister Comments on Food Radiation Detection (Dhaka THE BANGLADESH OBSERVER, 27 Nov 86).....	27
---	----

INDIA

Lok Sabha Supports Plans for Nuclear Energy Development (Bombay THE TIMES OF INDIA, 28 Nov 86).....	29
Papers Report Passing of Atomic Energy Bill (New Delhi PATRIOT, 9 Dec 86; Calcutta THE TELEGRAPH, 9 Dec 86).....	30
Minister's Remarks	30
MP's Discuss Nuclear Policy	31

PTI Commentator Notes Nuclear Research Achievement (K. S. Jayaraman; Delhi General Overseas Service, 27 Dec 86).....	32
Narora Nuclear Project Almost Totally Indigenous (Calcutta THE STATESMAN, 12 Dec 86).....	33
Briefs	
First Neutron Reactor	35
Nuclear Power Sought	35
'Most Dangerous' Plant	35
Pakistan Smuggling Uranium	36
Radioactive Waste Storage	36
Uranium Smugglers Arrested	36
French Nuclear Team	36
Group of 6 Urges Talks	37

ISRAEL

ERRATUM: In JPRS-TND-87-001 of 2 January 1987, under ISRAEL article titled NUCLEAR RESEARCH CENTERS SEEK EXTERNAL FINANCING, para 2, sentence beginning on line 9 should read "Thus, for example, the Nuclear Research Center in Dimona is proposing commercial cooperation in the derivation (beshihzur hafaqat)..."

PAKISTAN

Measures Taken To Protect Nuclear Plants (Saeed Qureshi; Islamabad THE MUSLIM, 23 Nov 86).....	38
Junejo Urges Locally Made Nuclear Equipment (Karachi DAWN, 22 Nov 86).....	39
PAKISTAN TIMES on India's Nuclear Capability (Farhatullah Babar; Islamabad THE PAKISTAN TIMES, 23 Dec 86).....	40
Briefs	
Weapons Development Efforts Alleged	42

SUB-SAHARAN AFRICA

SOUTH AFRICA

Ice-Filled Clothes for Koeberg's Divers (Mark Stansfield; Cape Town WEEKEND ARGUS, 8 Nov 86).....	43
Tighter Nuclear Controls To Be Introduced (Johannesburg BUSINESS DAY, 19 Nov 86).....	45

Possible Sites Identified for Nuclear Plants (Johannesburg BUSINESS DAY, 25 Nov 86).....	46
Escom Postpones Decision on Location of Nuclear Reactor (Cape Town DIE BURGER, 26 Nov 86).....	47
Briefs	
Radiation Found in Koeberg Sludge	48
Nuclear Safety Council New Chairman	48
USSR	
USSR: Pentagon Said To Actively Support Dimona (V. Lashkul; Moscow IZVESTIYA, 9 Oct 86).....	49
Pakistan Nuclear Weapons Program Examined (V. Kosovan; Moscow SELSKAYA ZHIZN, 5 Oct 86).....	50
WEST EUROPE	
EUROPEAN AFFAIRS	
Spain Reportedly Provides France With Plutonium (Madrid TIEMPO, 17 Nov 86).....	52
AUSTRIA	
Efforts Made To Sell Mothballed Zwentendorf Nuclear Plant (Inge Santner; Aurich NEUE ZUERCHER ZEITUNG, 6 Nov 86)...	54
FEDERAL REPUBLIC OF GERMANY	
Modernization of USSR Power Plants (Various sources, 11-14 Jan 87).....	58
Contract Reported	58
Official Comments	58
Spokesman Confirms Talks With USSR	59
Further on Agreement	59
KWU, Science Minister Comment on Deals	60
Soviet Envoy Confirms Contacts	61
Companies Deny Negotiations	61
SPAIN	
Garona Nuclear Waste Depository Termed Inadequate (Madrid YA, 27 Nov 86).....	62

TURKEY

Measurement of Radiation Level in Turkish Tea Discussed (Istanbul MILLIYET, 22, 29 Sep 86).....	63
Level Found in Munich, by Mehmet Aktan	63
Istanbul Radiation-Free Report, by Mete Akyol	63

/12223

HONG KONG

DISSENSION OVER, DISCUSSION OF DAYA BAY CONTINUED

Partial Release of Report

Hong Kong HONGKONG STANDARD in English 25 Nov 86 p 2

[Text]

THE Government released only part of the Lazard Brothers report to Legislative Councillors because it did not have confidence they could keep it under wraps.

Legislative Councillor Hui Yin-fat yesterday revealed this to four leaders of an anti-nuclear front who petitioned the Ormelco Office.

Mr Hui said even councillors had difficulty in getting access to the secret study on the financial viability of the Daya Bay project.

"The administration believes if the report is revealed to us, we will pass it on to you (the anti-nuclear lobby)," he said.

Mr Hui was commenting on one of the coalition's demands put forward to the Legco ad hoc group on Daya Bay. The 116-group Joint Conference for the Shelving of the Daya Bay Nuclear Plant project suggested the Government should at least disclose the Lazard report to councillors.

Rev Fung Chi-wood, who leads the anti-nuclear movement, argued: "If the Financial Secretary, Mr Piers Jacobs, insists that further revealing of the Lazard report will amount to breaching commercial confidentiality, he should at least let the councillors, who are representatives of the people, see the full report."

So far, only six pages of the classified document have been divulged through the Government's Daya Bay report to the Legco two weeks ago.

Mr Hui said he favoured further disclosing the report to the public. He noted that it was unwise to "keep commercial confidentiality at the expense of public confidence in the Government."

Councillor Desmond Lee said that apart from the loans arrangement for the \$28.8 billion project, he could not see why other information should remain under wraps as the Hongkong Nuclear Power Investment Co is a monopoly and is not subject to competition.

However, the convenor of the Legco ad hoc group, Mr Wong Po-yan, thought otherwise.

Mr Wong maintained that further disclosure of the Lazard report would set an undesirable precedent which might undermine foreign investors' confidence in the territory as a free port.

"We are only pressing for the disclosure of the secret information which is vital to public interest and safety, and are not interested in other commercial figures at all," argued Mr Lau Chin-shek, another activist in the coalition.

Deputy convenor of the group, Mr Chung Pui-lam, and Councillor Cheng Hon-kwan both said they had to consult further data before they could pass judgment on the Government report.

Councillor Poon Chi-fai, on the other hand, assured the coalition that he and his colleagues would hold the officials responsible for answering their queries on the Daya Bay project.

The joint conference also wanted the councillors to ask the Government to clarify some of the assumptions in the Lazard study, including projections on coal and oil prices as well as the expected working efficiency and decommissioning cost for the future nuclear power station.

Sand Filter System Likely

Hong Kong SOUTH CHINA SUNDAY MORNING POST in English 14 Dec 86 p 2

[Article by Albert Chan]

[Text]

THE Guangdong Nuclear Power Joint Venture Company "will almost certainly" accept the recommendation of Legislative Councillors, made only four months ago, to install the sand filter system at the Daya Bay nuclear station to improve its safety.

This was revealed yesterday by Mr Zeng Wenxing, deputy project manager of the company following a briefing session - the first of its kind - with the newly-formed Legco Daya Bay ad hoc group.

The last time the sand filter issue was brought up in public was in September, when a visiting Legco delegation in Beijing was told by top Chinese officials that China was still undecided whether Daya Bay would have the system as it was "untried", and further studies are needed before a decision could be made.

According to Mr Zeng, it is now almost certain that China will have the system, and a final decision is expected late next month.

This rapid development was made possible because the French safety authorities have recently completed their study and concluded that the sand filter system would enhance the safety standards of nuclear reactors. Mr Zeng said there had been some discussions with the French after the Chinese authorities received the Legco recommendation in early September.

In October, when officials of the joint venture company held their quarterly meeting with the engineers of Electricite de France - the French utility which is the engineering consultant to the Daya Bay project - the Chinese were told of the French authorities' decision.

"We were told that the French will install the system in all of its existing nuclear plants," said Mr Zeng. "Since the Daya Bay plant is a replica of the standardised French station, we will almost certainly add it to ours."

He said the joint venture company has since asked the French for a report on the financial and technical details of the system, and it is due later this month. The subject will be discussed in great detail in the next quarterly meeting, scheduled to be held in Paris in mid-January.

"A decision will be made then whether we will have it," said Mr Zeng.

The Chinese engineers have in the past remained non-committal and argued that careful consideration has to be given before a decision can be made. This is because the opening of the containment needed to install the sand filter system is quite large, and the possible adverse effects of incorporating the system in the containment building must be weighed against its advantages.

"The containment building is the last defence in case of a disaster, and any modification on current design will have critical impact on safety," Mr Zeng explained yesterday.

The sand filter concept was strongly pressed by Legco member Professor Poon Chung-kwong, who was one of the councillors on the Legco fact-finding trip to Europe in August. The recommendation was contained in the Legco fact-finding report released in late August.

The system will reduce the level of radiation released into the air in case of a nuclear accident where the containment of the nuclear reactor leaked as a result of pressure built up within

The released materials will go through the sand filter before it reaches the atmosphere, and the impact on the environment will be considerably reduced.

However some experts, particularly those in Japan, believe that such a back-up system is redundant as the safety features built into present nuclear reactors have already made it almost impossible for the pressure to rise to such a level that leaks will develop even in the event of an accident.

The Legco Daya Bay ad hoc group, led by Mr Wong Po-yan, yesterday visited the site of the nuclear station, about 30 km east of Shenzhen.

Mr Zeng gave the delegates a one-hour briefing on the background and latest development of the project, and this was followed by a discussion session.

Safety System Scored

Hong Kong HONGKONG STANDARD in English 15 Dec 86 p 5

[Article by Ursula Yeung]

[Text]

A BACK-UP system designed to heighten safety at the Daya Bay nuclear power plant is nothing but a "passive measure" that will lessen the severity of accidents but not prevent them, a nuclear activist said yesterday.

Rev Fung Chi-wood, leader of the Joint Conference for the shelving of Daya Bay, said the sand filter system — which the Guangdong Nuclear Power Joint Venture Company says will improve safety at the Daya site — is no guarantee against serious accidents.

"It is a new system and it has neither gone through severe testing nor been widely adopted," Rev Fung said.

Japanese experts are calling the back-up system re-

dundant considering the safety devices that are now installed into modern nuclear reactors, he said.

And the experts have doubts over how well the sand filter system would function during a serious accident, when a high level of radiation is leaking from the nuclear reactors, Rev Fung said.

"What the sand filter can do is to stop radioactive materials that are leaking out from the containment as a result of pressure built up within from reaching the atmosphere, and minimise the influence on the environment," he said.

"However, what it cannot do is to keep radiation entirely out of the atmosphere," he said. "It may

help in case of minor accidents when radioactive materials of low concentration are released.

"But for really serious accidents, there will still be little safety assurance for the people living nearby," he said.

Since the system relies on a steady electricity supply, a power failure would render it completely useless, he said.

Rev Fung urged Hong-kong residents to continue pushing for safety measures designed to help prevent accidents.

Such measures include increasing the numbers of back-up electricity generators for emergency use, pumps for safety water injection and safety water tanks, he said.

"The mechanical operation of the plant is what we are concerned about. Unless we are given enough

assurance in that area we cannot be relieved," he said.

Rev Fung added that a library with material on nuclear energy, nuclear plants and reactors used all over the world should be set up so that local people can keep abreast of the latest developments and monitor the situation at Daya Bay.

On Saturday, members of a Legislative Council Daya Bay ad hoc group — led by Mr Wong Po-yan — visited the site of the nuclear station and said they welcomed the proposed installation of the sand filter system.

The system — which was recommended to the Chinese Government by Legco members — was first brought up in public in September.

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CSO: 5150/0068

JAPAN

BRIEFS

FUSION TECHNOLOGY COOPERATION WITH EC--Tokyo, Dec. 5 KYODO--Japan and the European Community (EC) are likely to decide to work out a technical cooperation agreement on nuclear fusion technology at a bilateral ministerial meeting in Brussels slated for Thursday, government sources said Friday. An exchange of information on technology to realize nuclear fusion was first proposed at a regular Japan-EC ministerial meeting in November 1985. The technological cooperation would include an interchange of information and communications between Japanese and European researchers, the sources said. Currently, Japan, the EC and the United States are competing with each other to develop a commercial nuclear fusion reactor by the first half of the 21st century. The EC's experimental Tokamak-type nuclear fusion reactor, called "Jet," is leading other countries' reactors in nearing criticality in terms of plasma density, plasma temperature and duration of plasma confinement inside a reactor vessel. An experimental "Jt-60" Tokamak-type nuclear fusion reactor of the Japan Atomic Energy Research Institute started full-scale tests in Naka, Ibaraki Prefecture, north of Tokyo, three months ago. [Text] [Tokyo KYODO in English 0213 GMT 5 Dec 86 OW] /h662

CSO: 5160/022

MILK STILL SHOWING TRACES OF CHERNOBYL RADIOACTIVITY

Ottawa THE OTTAWA CITIZEN in English 12 Dec 86 p A5

[Text]

Canadian milk samples still show slight traces of radiation contamination from the nuclear reactor accident at Chernobyl last April, says a report tabled Thursday in the Commons.

However, the report from a committee which has been studying the impact of the Ukrainian nuclear incident upon Canada says the total amount of radiation to reach the country presents a negligible health hazard.

"If we thought there was any kind of risk, we would have banned the product," said Health and Welfare Canada spokesman Joan-Eddie Topolski.

She added the low levels of radiation in the milk are harmless to both infants and adults.

No one was exposed to more than 10 microsieverts of background radiation, the report says. A microsievert is a measure of radiation. A single chest X-ray gives a patient a 100-microsievert dose of radiation.

Because there are still traces of the element radiocesium in Canadian milk, the report says month-

ly sampling of milk — started a few weeks after the reactor accident — will continue until at least June. The Health Department normally samples milk every three months.

The report says the radiocesium content in milk is most likely due to fallout during the summer haying season.

Monitoring of air, water, food-stuffs and ground radiation in the two months after the accident show Vancouver received the highest degree of fallout among the 28 areas measured. Total doses in May and June in Vancouver were 1.63 microsieverts, three times the national average of 0.58.

The lowest total radiation dose, 0.17 microsieverts, was measured in Toronto.

The report shows the highest fallout levels came from radioactive materials that were lifted to high altitudes and carried around the world by prevailing westerly winds.

That fallout reached the West Coast by May 7 and eventually spread across the country.

CSO: 5120/3
/9317

ONTARIO HYDRO NUCLEAR SAFEGUARD TECHNOLOGY DESCRIBED

Toronto THE GLOBE AND MAIL in English 29 Dec 86 p B12

[Article by Tamsin Carlisle: "Ontario Hydro Goes Full Steam on Its Nuclear R&D"]

[Text]

Although political fallout has been suffocating the nuclear energy industry, especially since the Chernobyl reactor spewed a radioactive cloud, Ontario Hydro is pursuing programs costing well over \$100-million to develop leading-edge technology for inspecting, repairing and refurbishing nuclear reactors.

This summer's disaster at the Ukrainian nuclear plant is the latest in a series of accidents that have plagued the industry. But one salutary effect of the mishaps — which include an accident at Ontario Hydro's nuclear power plant in Pickering, Ont., in 1983 — has been to spur development of technology that will safeguard against future problems and to ensure that worn reactor parts can be replaced safely.

Experts at Ontario Hydro also contend the new inspection and repair techniques will save many millions of dollars, by dramatically reducing reactor shutdown time.

Some of the giant utility's most significant developments in this field include a device that uses ultrasound to inspect fuel channels, another tool that employs electromagnetic fields to move parts inside reactor tubes, and a novel system for removing the radioactive waste that accumulates on the tubes' metal surfaces.

Spar Aerospace Ltd. of Toronto has developed a high-precision robot arm for Ontario Hydro, as part of a complete system for removing and replacing worn tubes in Candu

reactors. The Spar package also includes radiation shielding for workers, a video system, remote-controlled tools, and a control centre for the robot arm and other tooling.

The arm is a massive, hydraulically operated machine weighing 15 tons, yet it can "bring down a sewing needle on the tip of a coffee stirrer set on a tripod 20 feet away from it," said Christopher Trump, vice-president of Spar.

This pinpoint accuracy, made possible by sophisticated computer software, enables the gigantic mechanical claw to handle six-metre zirconium alloy tubes after heat and radiation have turned them as brittle as glass. Because the worn-out tubes are highly radioactive, they must be removed in one piece, "absolutely without wavering," and then carefully disposed of, Mr. Trump said.

The system cost Spar \$40-million to develop. The company delivered the high-tech behemoth to Ontario Hydro last spring. The robot can perform its task faster than a human cleanup crew, while reducing the need to place workers in a hazardous, radioactive environment, he said.

But Edward Bennett, a supervising design engineer in Hydro's nuclear systems division, said the Spar arm, now in storage at Pickering, may never be used because the utility has developed an alternative system for tube replacement.

"We were developing the (Spar) system for retubing nuclear reactors when we found a break in one of our tubes at Pickering," Mr. Bennett said, referring to the 1983 accident in which radioactive gas leaked from a cracked tube, but was prevented from contaminating the outside environment. "We had to rush in and retool before the semi-remote system was ready. We went to a mainly manual approach."

The system Hydro developed to replace tubes in the damaged Pickering reactor, and that it may use for future refurbishing projects, employs human operators close to the reactor. (They are protected by shielding that was part of the Spar system, and by a process for decontaminating the reactor face.)

"In 1975, when we signed the contract with Spar, we thought that because of the high radiation fields we were encountering we had to go in for a system that removed men from the reactor environment as much as possible. But now we have come through with our 'Can-decon' system, which has lowered the fields dramatically," Mr. Bennett said.

However, he said, the investment in the Spar system provided insurance in case the manual system turned out not to be workable and may provide a basis for future advances.

The Can-decon system is a process for cleaning radioactive corrosion products from reactor tubes.

Scientists at Ontario Hydro and Atomic Energy of Canada Ltd. of Ottawa developed the process in 1969-73. Can-decon was tested in 1975 in a large-scale decontamination project at the Douglas Point reactor near Kincardine, Ont., which Ontario Hydro operates for AECL.

Marketing rights for the process belong to London Nuclear Ltd. of Niagara Falls, Ont., and London Nuclear Services of Niagara Falls, N.Y. These companies are subsidiaries of London Nuclear Technologies Corp. of Columbia, S.C., which is Canadian-owned.

(Eric LeSurf, president of LN Ltd. and LNS, said the U.S. company has used Can-decon to decontaminate more than 40 reactors in the United States, and typically charges \$500,000 for the service.)

The system continuously circulates dilute solutions of weak organic acids through the reactor tubes, gradually dissolving away corrosion products such as metal oxides. During each cycle, the contaminant-laden fluid percolates through resin columns that remove radioactive metals and regenerate the solution's acidity.

□ □ □

Another Ontario Hydro invention whose development was stimulated by the Pickering accident is a system called SLAR, for "spacer location and repositioning."

Spacers are garter springs that separate the double walls of horizontal tubes radiating outward from the central tank of a Candu reactor. Each spoke contains a thick inner pressure tube, filled with atomic fuel and water that is heated by the fuel to generate electricity. A thinner-walled outer casing is separated from the pressure tube by spacers strung through a gas-filled space.

When the tubes vibrate or sag, the spacers in all but the most recently designed reactor units can move out of position, allowing inner and outer tubes to touch, said Ian Lauchlan, SLAR project manager. This may lead to local heating and blistering of tubes, and at Pickering caused an outer tube to rupture.

"We had to do something really different here because of the constraints — radiation and time constraints. We used to call it 'Mission Impossible,'" said Mr. Lauchlan, recalling how Hydro researchers discarded more than 20 plans for repositioning spacers before they hit on one that worked.

The heart of SLAR is a modified refueling tool, equipped with advanced electronics, and backed up by software to interpret complex electromagnetic signals. The tool fits inside the inner pressure tube, and generates magnetic fields that drag the garter springs back to their correct positions.

"We believe we'll be able to process a channel, move fuel out, look for spacers and reposition them, replace the fuel, all within a four-hour period. Before, it took almost 10 times as long — and that was with reactors under construction that didn't contain any fuel," he said.

The SLAR project, which has already cost about \$50-million — raised jointly by Ontario Hydro, AECL, Hydro-Quebec and the New Brunswick Electric Power Commission — is still in the development and testing phase, Mr. Lauchlan said.

AECL and Canadian General Electric Ltd., which both designed fueling tools for Candu reactors, are testing the SLAR system in their laboratories, respectively near Toronto and in Peterborough, Ont. Mr. Lauchlan predicts the tool will be ready for use by the end of 1987.

But, once again, this is a system that Ontario Hydro may never use. "The SLAR tool was developed as an insurance policy. If we find we do have to use it, then we have the tool and the knowledge available," Mr. Lauchlan said.

He explained that older reactor tubes have been replaced by tubes made from a zirconium-niobium alloy, which does not become brittle as rapidly as previous zirconium alloys. And even if tubes made from the newer material touch, the time required for hot-spots and blisters to develop may be many years.

"If this time turns out to be more than the lifetime of the reactor, we won't have to bother with SLAR."

□ □ □

One system that Ontario Hydro is using regularly is a remote-control system for inspecting fuel channels, called "channel inspection and gat-ing apparatus for reactors."

CIGAR is "a large machine that sits in front of the reactor, with an inspection head installed by the machine that normally does refuel-ing," said Michael Dolbey, a senior research engineer in Hydro's metallurgical research division.

The head, loaded with sensitive electronic equipment, was manu-factured using materials that are especially resistant to high-radia-tion fields.

A Candu reactor has many dou-ble-walled fuel channels — 390 in older reactors and 480 in the newer, more powerful installations, Mr. Dolbey said. CIGAR inspects the inside of all these tubes regularly.

The system makes several types of measurement in its search for flows, blisters, or any other change that might affect the structural integrity of the channel.

One process involves "fairly conventional" ultrasound technol-ogy: sound waves are bounced off the inside surface of a pressure tube to detect irregularities. Another makes use of longer, more penetrat-ing sound-waves to measure wall thicknesses by comparing the re-turn time for reflections from inside and outside tube surfaces.

A third measurement system employs an ultrasensitive slope-measuring device to determine how much a tube has sagged from struc-tural changes in the zirconium alloy because of heat and radiation.

Finally, CIGAR generates elec-tromagnetic eddy currents that are used to check the position of the spacers that separate inner and

outer tubes.

Mr. Dolbey said he thinks CIGAR, which cost about \$5-million to develop, is the leading system of its type in the world. However, other countries with similar reactors are also designing inspection systems. Recently, Ontario Hydro sold a CIGAR system to the Italian atomic energy industry. It is being tested and will be delivered next year.

The utility also provides inspec-tion services for reactors in Quebec and New Brunswick, and has signed a tentative contract to inspect a Candu reactor in Argentina. Mr. Dolbey said.

□ □ □

And the research to make nuclear reactors safer goes on.

One of Ontario Hydro's current projects is to develop a remote-con-trol camera system for high-radia-tion environments that can examine a weld while it is being made. The system will be an integral part of a rehabilitation project at the Bruce Nuclear Power Complex at Douglas Point, Ont., where engineers are trying to compensate for elongation in some reactor fuel channels.

"We need to develop a camera that is immune to temperatures above 200 degrees Celsius, and also immune to electromagnetic radia-tion from the weld arc," said Andy Meysner, a design engineer in Onta-rio Hydro's research division.

Because repair work on reactors must often be performed within tight spaces, Ontario Hydro is using a miniature camera, 41 mm square by 51 mm long, he said. Hydro's engineers have designed a fibre-optics delivery system, but at pre-sent the camera can be brought no closer to the weld arc than 25 me-tres.

19365

CSO: 5120/4

ARGENTINA

RADIOACTIVE MATERIAL SPILLS AT AIRPORT

CNEA Shipment to Canada

PY121222 Buenos Aires TELAM in Spanish 1153 GMT 12 Jan 87

[Text] Buenos Aires, 12 Jan (TELAM) -- An Ezeiza International Airport spokesman has reported that radioactive material of an undefined level of toxicity was spilled early this morning at the airport when some tubes belonging to the National Atomic Energy Commission (CNEA) broke. The tubes were being shipped to Canada. The incident occurred today at approximately 0330 when several tubes, the contents which have yet to be specified by the CNEA, were being loaded on a Jumbo 747 of the Flying Tigers U.S. cargo specialist company. The airport spokesman disclosed that two or three tubes fell from a vehicle that was carrying them to the airplane, spreading over the field a yellow cloud that ascended into the atmosphere.

The airport's CNEA and Federal Police Fire Department personnel conducted an immediate inspection and began a cleaning operation that ended after 0530. The cargo plane was then moved to another area of the airport. Horacio Gaminin, an official of the U.S. company in charge of shipping the CNEA tubes, reported that it was a minor accident without major consequences and that there is no danger of contamination. Spokesmen of the Federal Police and the CNEA said that they will release an official report on the incident.

Material Identified

PY121742 Buenos Aires TELAM in Spanish 1450 GMT 12 Jan 87

[Excerpts] Buenos Aires, 12 Jan (TELAM) -- Federal Police sources today reported that three tubes containing uranium oxide, which were being shipped to Canada for enrichment, spilled early this morning at the loading platform of Aerolineas Argentinas in the Ezeiza International Airport. [passage omitted]

Personnel of the Radiological Section of the Federal Police Fire Department indicated that the spill does not pose any danger of environmental radioactive contamination.

CNEA Issues Communique

PY130253 Buenos Aires TELAM in Spanish 0057 GMT 13 Jan 87

[Text] Buenos Aires, 12 Jan (TELAM) -- The spill of drums containing natural uranium concentrate on one of the platforms at Ezeiza International Airport this morning has prompted the National Commission for Atomic Energy [CNEA] to issue a communique stating that the transportation of this material is a normal procedure not subject to risks and carried out according to international regulations. Moreover, natural uranium is only slightly radioactive.

The CNEA states: "Today, at 0215, as a shipment of natural uranium was being loaded aboard a Flying Tigers Transportation Company airplane bound for Canada, 19 drums of natural uranium concentrate fell from the platform from which they were being loaded.

"As a result of the fall, some of the drums were damaged and some of the natural uranium concentrate powder spilled on the platform.

"As soon as this incident was reported, the CNEA sent specialized personnel to the site to recover the spilled material.

The material was then taken to the exclusive CNEA area at Ezeiza Airport to be repacked.

"Natural uranium shipments to Canada constitute a normal operation that does not pose any risk because the shipments are carried out according to international regulations. Moreover, natural uranium is only slightly radioactive.

"Given these characteristics and the fact that the material was recovered, this incident has not affected the health of any airport personnel involved in the operation, and it obviously does not represent any danger to the health of the population.

"In conclusion, the CNEA finds it necessary to point out that, despite some negative reports issued immediately after the incident, there has not been any [words indistinct] or further from the specific area where the material spilled."

/9604

CSO: 5100/2064

ARGENTINA

BRIEFS

NUCLEAR AGREEMENT WITH BRAZIL--ENACE [Argentine Nuclear Enterprise for Electrical Power Plants], an Argentine state-owned enterprise, and Nuclean [Nuclebras Engineering, Inc], a Brazilian state-owned enterprise, have signed an agreement implementing a technical exchange between the two nations in the atomic energy field. The agreement was signed by ENACE President Engineer Abel Gonzalez and Nuclean President Engineer Fernando Henning and is part of the economic integration plan signed by Argentina and Brazil in June 1980. The agreement provides for increasing the current exchange from an estimated \$200 million to \$2 billion by late 1990. ENACE and Nuclean are charged in their respective countries with planning and constructing nuclear power plants. The agreement provides for exchanging technical services in the engineering field on these power plants. It must be noted that cooperation in the field of nuclear energy is one of the points agreed upon by Presidents Alfonsin and Sarney as part of the 20 agreements for bilateral integration signed in Buenos Aires and Brasilia. The agreement was signed at the ENACE building, at 712 Leandro N. Alem Avenue. [Text] [Buenos Aires LA PRENSA in Spanish 11 Jan 87 p 3] /9604

CSO: 5100/2064

CNEN SECRET BANK ACCOUNT TO BE INVESTIGATED

PY051356 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 4 Jan 86 p 29

[Excerpts] "The case of the National Nuclear Energy Commission's secret bank account may be the tip of an iceberg," National Treasury Attorney Juarez Tavares, reported yesterday. He has just requested the Federal Police to initiate investigations regarding this account. The investigations will start by taking statements, including those from the CNEN President Rex Nazare Alves, next week.

"It does not matter to me that a parallel nuclear program is in progress and it needs special funds. As National Treasury Attorney, I have to watch over public money. As far as I know, the law does not say that I should be more understanding over nuclear affairs, nor does it forbid me from raising questions about the approval of secret decrees," Juarez Tavares said.

The National Treasury Attorney states that the Federal Police have the obligation to open investigations on orders from this office. Once the investigations are completed, the results will be submitted to the National Treasury Attorney, who can then determine whether the case should be closed, or a criminal suit should be filed with the Court, or returned to the Federal Police for additional evidence.

The existence of a CNEN secret bank account under the name of "Delta Three" was revealed by the press and it was not officially denied or confirmed. According to the denunciation, the secret account, which was opened in 1981, was handled by CNEN President Rex Nazare Alves and CNEN technical coordinator Carlos Lemos Campos, colonel of the reserve, without any control.

In 1981 alone, according to press reports, the equivalent to 30 million cruzados were invested on the open market. The CNEN silence regarding this secret account only raises speculation, more so because Military Cabinet Chief General Bayma Denys has affirmed that there is nothing illegal about the account.

/12858
CSO: 5100/2059

IMPACT OF POSSIBLE ANGRA ACCIDENT ON RIO ASSESSED

Rio de Janeiro O GLOBO in Portuguese 3 Nov 86 p 9

[Article by Paulo Motta: "Nuclear Accident May Contaminate Rio's Water and Food"]

[Text] A serious accident at the Angra I nuclear power plant could, under specific circumstances, cast a radioactive cloud over Rio de Janeiro or cities of middle Paraiba. That cloud, even with a low degree of radioactivity and without creating a danger to the population, would require a strict watch over the water and food exposed to contamination, according to the coordinator of the Emergency Group of the Institute of Dosimetry and Protection Against Radioactivity (IRD) of the National Commission for Nuclear Energy (CNEN), Marcos Cesar Ferreira Moreira.

According to him, although the evacuation area be restricted to a radius of 15 Km around the nuclear power plant, which will include the residents of Angra dos Reis, the possibility that the cloud would reach Rio would depend on the type and extent of the nuclear accident, as well as on the development and behavior of the radioactive plume in the atmosphere. The Ingestion Planning Zone established by the CNEN covers an area of 40 Km around the plant, which covers the cities of Parati, Mangaratiba, Lídice and Bananal. All agricultural and livestock production, fish, and drinking water treatment plants of the region will have to be inspected in case of a radioactive release. The Ingestion Planning Zone, however, covers only half of the region established by studies made in the United States (Wash-1400, Nureg-396 and 654) contained in the report "Reactor Safety Study." Those studies call for the same inspection over an area of a 50 mile radius (80 Km), which would cover the western zone of Rio, in addition of Resende, Barra Mansa, Volta Redonda, Pirai and a long stretch of the Paraiba do Sul River, including the Lajes Dam from which the Guandu System draws 80 percent of the water for the Rio Metropolitan Area.

"We are going to maintain a watch as far as is necessary. A radioactive cloud can spread over large areas, as happened in the Chernobyl accident, where the radioactive plume crossed almost all of Europe. A cloud from an accident at Angra I, depending on the type of disaster and the weather conditions, can reach as far as Rio de Janeiro but with low radiation levels, which would not mean a direct danger for the population. We would need to check the levels of radiation in the food and water used for public consumption, however," said the coordinator of the IRD Emergency Group.



The map shows the extensive area that would be affected in case of a serious release of radioactivity into the atmosphere.

Marcos Cesar Ferreira Moreira said that the agency will have to inspect and monitor milk, meat, fish and water distributed to the population. The IRD already has a record of the farms and agricultural-livestock production zones within the 15 Km radius around the power plant, but has not even started the same survey in the zone in the 40 Km radius--the Ingestion Planning Zone. Taking into consideration the area of 80 Km around the plant suggested by the American study, the main production areas reached by a low radioactivity cloud would be that of bananas (southern coast), fish (Bay of Ilha Grande and that of Septiba), the dairy basin of the area of Resende and Prai, the green belt of Itaguai (production of okra, chayote, tomatoes and eggplant) and the food industries of the Paraiba Valley.

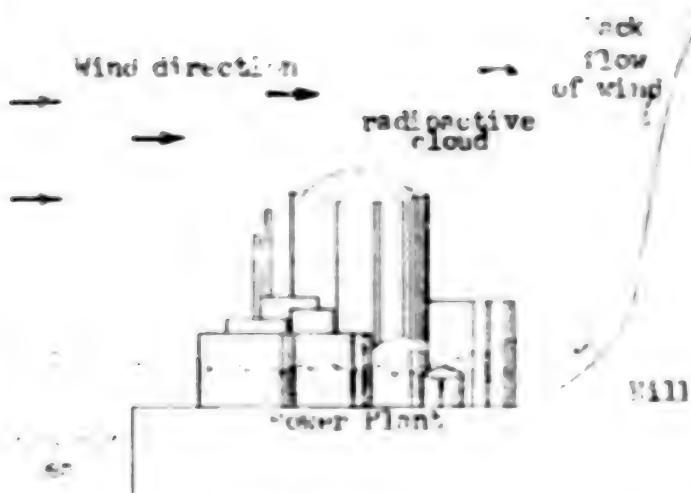
"It is also important to know what type of radioactive release it is. If it were to be a liquid release, the inspection to be done by the IRD would be with respect to the contamination of sea water and, secondarily, of the ground. It is not the worst case scenario, since the large volume of water would facilitate the dispersion and dilution of radioactivity. The areas most affected would be the Piraquara de Fora Inlet (where the plant discharge tunnel is located) and the bay of Itaorna itself, where some of the pipes from the nuclear power plant discharge. The release of gas would require a greater monitoring, primarily of agricultural products and all the other means of ingestion (air and water), explained the coordinator of the IRD Emergency Group, Marcos Cesar, and the chief of the Radiometry Division, Luis Fernando Conti.

According to IRD technicians, milk and vegetables are the products that receive the greatest contamination due to the sedimentation of radioactive particles. Edible roots such as mandioca are contaminated later on. Water is no longer considered a sure indicator of radioactivity due to its great dilutive powers.

Geography and Winds Would Protect Angra dos Reis

A radioactive cloud from the Angra I Power Plant would have only between 0.1 and 1 percent chance of reaching the city of Angra dos Reis because of topographic and meteorological conditions of the region. This is stated in a study by the chief of the Nuclear fuel and Safety Department of FURNAS [Brazilian Power Plants], Ronald Araujo da Silva, who is also president of the Brazilian Nuclear Energy Association.

After reaching the atmosphere, radioactive material would spread in accordance with several factors: Topography, height of the cloud, rainfall, dispersion and decay of radioactive materials and the direction, speed and persistence of the winds. According to the study, the topography of Angra dos Reis, particularly in the area of the plant, tends to create special phenomena, where abrupt changes in wind direction would keep the radioactive plume in the area of the plant for a long time.



According to FURNAS, the radioactive cloud would tend to remain stationary over the plant.

"FURNAS studied the winds of the region for 3 years. We confirmed that a good part of the time the situation is calm and only once in a while do the winds flow from the West, that is, in the direction of the city of Angra dos Reis. The average maximum persistence of those winds from the West was that of 2 hours 48 minutes, and we can say that the possibility of a radioactive cloud remaining over the city for long periods of time is practically nonexistent," said Ronald Silva.

He guarantees that in the short term it will not be necessary to remove the population from the city and he proposes to reduce the evacuation area to up to 5 Km around the plant, which covers the areas of Frade, Mambucaba, the residential district of Praia Brava and some islands. Ronald Silva concludes in "Analysis of the Needs and Conditions for Evacuation of the City of Angra dos Reis" that the greatest possibility is that a possible radioactive cloud will remain stationed over Angra I.

The study uses the model of a maximum credible accident established by the CNEN. That accident would begin with the rupture of a length of piping in the primary system and, despite every supplementary system for injecting water, part of the reactor core would remain uncovered for some time, with deformation of the fuel and the release of radioactive material taking place. The release of radioactivity (primarily Cesium 137, rare gases and iodine 131 and 133) would take place at a constant rate of 0.1 percent per day. There would be no rupture of the containment structure.

"It is necessary to point out that the probability of that type is of 1 in 10,000 years of operation. An accident with a break in containment has an even more remote probability: 1 in 40 million years," said Ronald Silva.

The most urgent measures of protection for the population of Angra dos Reis would only be put into effect, however, if the dosage of radiation for the residents exceeded the limits established by the CNEN. The technician explained that the CNEN adopted an emergency model that overestimates the propagation of the radioactive cloud, using a flat region, not broken like that of Angra dos Reis. In this study Ronald Silva concluded that the time for the arrival of a radioactive cloud at Angra is much greater than the 15 days estimated by the CNEN.

However, the man responsible for the Environmental Surveillance System of COPPE/UFRJ [Coordination Board for Postgraduate Engineering Programs/federal University of Rio de Janeiro], Luiz Fernando Seixas de Oliveira, states that with a wind of 18 Km per hour the radioactive cloud can reach the city in less than an hour. A typical wind would be 6 Km/h, carrying the radioactive cloud to the city in 3 hours.

Protective measures in case of accident are: Order the population to seek shelter, distribute potassium iodine tablets for preventing the accumulation of radioactive iodine in the thyroid, evacuation and interdiction of water and food. The measure preferred by the CNEN is evacuation. The immediate concern with respect to contamination of human beings is iodine 131, which is accumulated in the thyroid and which is released in large quantities in an accident.

Federal and State Civil Defense continue to study the so-called evacuation plan. The four towers on which alarm sirens are to be installed will be ready next week. They are located at Km 137 of the Rio-Santos Highway (Barlavento, to the west of the plant) and near Frade (Constanca Hill, Frade Ranch and Salomao Reseach School). Up to now, however, nothing has been said about the wild animals of the region.

Deficient Safety System to be Corrected by New Computer

The Angra I Power Plant safety system is not capable of correctly evaluating a radioactive leak, according to a report by the Operational Safety and Review Team of the International Atomic Energy Agency (IAEA) revealed recently. The study indicates that an efficient response to an accident outside the area of the power plant depends on a rapid evaluation of the leak, as well as of its environmental consequences.

However, the document points out that the National Commission for Nuclear Energy (CNEN) acquired a sophisticated Tektronix computer for improving its activities in the sector. Moreover, Furnas Electric Power Plants, in an agreement with the COPPE of the UFRJ, is putting the finishing touches on the plan for the installation of a complementary computerized system to improve the operation of the plant, prevent and maintain a watch over accidents and follow the progress of any radioactive discharge into the atmosphere. The recommendation by the IAEA became a requirement for the CNEN and FURNAS should install the new system by the end of 1987.

The FURNAS and COPPE/UFRJ plan is called "System of Supervision of Safety Parameters for Angra I" and was initiated three and a half years ago under the coordination of COPPE Vice Director Professor Zieli Dutra Thome Filho. According to the internal bulletin of FURNAS, the nuclear accidents at Three Mile Island (United States) and Chernobyl (Soviet Union) could have been prevented or would have been less serious, if the two nuclear power plants had had this type of computerized system.

There are hundreds of numbers in play during the operation of their reactors, displayed by many panels, dials, graphics, meters and emergency lights. The main advantage of the new system is that it is capable of gathering so many factors in a single computer screen at high speeds, allowing a rapid interpretation of that enormous block of figures.

"It was as of the accident at Three Mile Island that it was perceived that nuclear reactors can have accidents of great proportions. The Americans developed new methods then, and we are studying those recommendations. We seek an adaptation to the case of Angra I and to the type of operation used in Brazil. We have more than 100 different screens in microcomputers today and we monitor 1,500 signals from sensors installed throughout the plant. FURNAS could have purchased that system abroad, but would have to pay up to \$25 million. However, FURNAS believed in national technology and our system will not cost more than \$4 million. The four digital computers purchased abroad are already arriving and it is necessary to point out that we shall go on to master that leading edge technology and will even be able to export it in the future," said Zieli.

The new plan consists of three systems. The first is called "Integrated Parameter Monitoring System," and is designed for gathering all information the operator needs to operate the plant. It also provides the history of the plant and the tendencies and probabilities of emergency situations.

The second one is called "Critical Safety Functions System" and will be used when the reactor has already suffered some anomaly that will determine its being shut down. It allows the monitoring of each fundamental function, which if broken down can affect the safety barriers of the plant: the fuel core, the fuel rod cladding, the primary circuit and the containment building. To the chief of the Nuclear Fuel and Safety Department of FURNAS, Ronald Araujo da Silva, the new technology considers action by the operator before the automatic system shuts down the plant.

"The system is for guaranteeing that these barriers remain intact. It is a preventive system for the purpose of instructing the operator of the plant to take the necessary measures to prevent a minor accident from becoming worse, and for preventing the contamination of the environment. Actually, these two systems are even a novelty abroad and will greatly increase safety conditions in Angra I," said the vice director of COPPE.

The third system is designed for the surveillance of the environment and will only become operative in case of a nuclear accident with the release of a radioactive cloud. Angra I today has a similar system but it is not automated and is unadapted to the geographical conditions of Angra dos Reis, in addition to not giving a quick response. The new system will report every 15 minutes in a more accurate manner as to the dosage of contamination, direction and position of the radioactive plume, picturing those parameters in computer screens to be installed in the plant in a future Emergency Management Center to be built in Mambucaba and at FURNAS and CNEN headquarters in Rio.

"The system will also allow the making of forecasts of up to 2 hours for the movement of the cloud, taking into consideration the topographical and meteorological conditions of the region. With that information, it will be possible to organize an emergency program and to orient a population evacuation plan," explained the man responsible for the plan, COPPE Professor Luiz Fernando Seixas de Oliveira.

The Environmental Surveillance System will describe the radioactive material released (composition and rate of release) and will consider all the phenomena that will have an influence on the cloud in its travel such as winds, depositing of particles, and radioactive decay. Meteorological data will be obtained from four towers already installed near the plant.

Physicist Not Convinced by Study and Insists on Rapid Evacuation

Luis Pinguelli Rosa, Adviser to the Brazilian Physics Association, considers the study by Ronald Silva on the hypothesis of an accident at Angra I to be deficient. He says that the possibility of a rupture of the reactor and containment vessels was not considered and that although it is a remote possibility it cannot be discarded. The physicist insists on the need for plans for a rapid evacuation of the residents of Angra dos Reis.

He was a member of the commission appointed recently by President Jose Sarney to evaluate the safety of the Brazilian Nuclear Program and he declares that the conclusions of Ronald Silva are based on the occurrence of the so-called maximum credible accident hypothesis accepted by the CNEN with a dialy release of only 0.1 percent radioactivity.

"That concept is vulnerable, since it is the choice of the technician, which cannot exclude the possibility of worse accidents than the one chosen, although he may consider them of low probability. Actually, the social perception of danger is different than the perception by specialized technicians. This means that society may not accept a risk that the technician considers low and therefore acceptable. Accidents such as those of Chernobyl and Three Mile Island show that society has its reasons," said Pignelli.

The physicist explains that a reactor does not explode like an atom bomb. He says, however, that the rupture of the containment vessel, for example, in a steam explosion in the reactor vessel that would hurl its top against the inner containment wall, cannot be discarded. He said that if that were to happen, the release of radioactive material could be much greater than the 0.1 percent per day supposed by the CNEN model for the worst case credible accident. In a FURNAS publication dated December 1983, Professors Arthur Moses Thompson Mota and Luiz Fernando Seixas de Oliveira of the COPPE/UFRJ also declared that despite the extreme remoteness, there is the probability that a nonnuclear explosion could take place in a nuclear power plant.

"It is necessary to be careful. Extremely low probabilities do not mean an impossibility. Actually, there is the possibility of an accident with the total uncovering of the core. Accidents in aircraft are also rare but they happen. Not even because of that can those responsible for the safety of aircraft relax and refrain from preparing for every possibility. The entities having to do with the nuclear question must be duly prepared for any type of accident," said Pinguelli, who adds that he disagrees completely with the conclusion that the evacuation of Angra dos Reis in a hurry is not necessary.

8908
CSO : 5100/2046

PROPOSED NIOBIUM PROJECT SAID TO ENDANGER STRATEGIC METALS

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 12 Dec 86 p 4

[Text] If the Industrial Development Council (CDI) approves the metallic niobium exploitation project of the CBMM--the Brazilian Mining and Metallurgy Company--Brazil will run the serious risk of losing the production of strategic metals to foreigners, including, beginning in the next decade, the process of nuclear fusion, which is considered the inevitable result of obtaining safe energy from the atom. This warning was made yesterday by contractor Jose Diniz de Souza, director-president of Eletrometal S/A Metais Especiais, a firm headquartered in Sumare, in the Campinas region, and which since 1972 has participated in projects involving the domestic manufacture of superalloys, pure refractory and reactive metals, in conjunction with the Armed Forces and with the support of BNDES.

According to Diniz de Souza, "there are reliable indications that the goal of CBMM is to cover the entire spectrum of strategic metals," beginning with niobium and extending to the titanium (which, mixed with niobium, will form "zircalloy," the basis for future nuclear fusion reactors) used in current nuclear fission plants, and tungsten, molybdenum, tantalum and hafnium, used in nuclear reactors for naval propulsion. The contractor also claimed to have information from trustworthy sources regarding the activities of the Moreira Salles Group, owner of CBMM, in association with the multinational firm Anglo American, which controls the production of tungsten and ferro-molybdenum in Brazil.

Diniz de Souza believes that "a cartel involving 3 powerful multinational firms--Molycorp, Unocal and Anglo American--is taking shape, associated with the Moreira Salles Group, which will control the resources and reserves of strategic minerals in Brazil and, as a result, the production of pure metals and their alloys." According to the Eletrometal president, "this scenario becomes even more probable in the face of Anglo American's situation in South Africa, where its resources and mineral reserves are threatened by the reactions against the apartheid system."

Another motive identified by Diniz de Souza as a "cause of foreign interest in the exploitation of Brazilian strategic metals" is the inevitable harnessing of nuclear fusion in the 1990s. He anticipates that a nuclear fusion pilot plant will be ready by 1991, with operations on an industrial scale beginning

in 1995. "Almost 15 years ago," relates the contractor, "Eletrometal developed projects in this field with the Brazilian government. Now, a market has been formed, in which they are attempting to isolate us from the process."

The Eletrometal president warns even more of the damages the country could suffer as a result of this exploitation. Diniz de Souza says that the CBMM intends to export niobium ingots at a price of \$45 per kilogram, while Eletrometal has the technology to produce niobium plate, bars and tubes at \$125 per kilogram, and a niobium-titanium super-conductor costing up to \$2,000 per kilogram. "We want," observes the contractor "to export a finished product completely developed in Brazil. The CBMM now wants to send raw materials of low value overseas. If that happens, the profit will remain with the foreign groups, who will process the raw material and sell it." Jose Diniz de Souza emphasizes that he is not against the multinationals, but that he is trying to "defend the Brazilian presence in a sector that will be, within a short time, fundamental in economic and even political terms." This concern, the contractor points out, is shared by the Armed Forces Chief of Staff who, he says, has initiated discussions with Minister Aureliano Chaves of Mines and Energy, Jose Hugo Castello Branco of Industry and Trade, and Rayma Denis of the Military Cabinet, and indicated his apprehension at the possibility of approval of the CBMM project.

13026/13104
CSO: 3342/50

BRAZIL

BRIEFS

NUCLEBRAS BURYING CANS OF WASTE--Roberto Miranda, chief of the Nuclebras Technical Advisory Department, yesterday admitted for the first time that large cans of waste materials from nuclear power plants are being buried in the Buenas district in Sao Joao da Barra. While making the statement in Campos during a meeting held in the offices of the Federation of Rio de Janeiro Industries, Firjan, Miranda assured those present that this waste is not radioactive. The meeting was convened by the town councils of Campos and Sao Joao da Barra, and by the North Rio de Janeiro Center for the Conservation of Nature, which asked that the contents of the large cans be analyzed. Miranda delivered a sample of the material in question to Councilman Benedito Marques so he could arrange whatever analyses he deems necessary. [Text] [Rio de Janeiro O GLOBO in Portuguese 12 Dec 86 p 10 PY] /12858

CSO: 5100/2059

LAGUNA VERDE TO BEGIN OPERATIONS IN FIRST HALF OF 1987

PA140358 Mexico City EXCELSIOR in Spanish 11 Dec 86 pp 5-A, 40-A

[For related item, see JPRS WORLDWIDE REPORT: NUCLEAR DEVELOPMENT & PROLIFERATION of 11 Aug 86 (JPRS-TND-86-017), p 24.]

[Text] Ruben Bello, director of the National Institute for Nuclear Research, ININ, yesterday reported that the Laguna Verde nuclear plant will start operations in the first half of 1987.

After seeing the experimental nuclear reactor resume operations in the Salazar, State of Mexico, operations center, Bello said that the Laguna Verde activities are absolutely safe. Bello praised the local technicians' ability to run this plant.

In Salazar, the TRIGA Mark III reactor remained inactive for 20 months due to a water leak detected on 24 April 1985. The reactor had run for 16 years faultlessly, but the metallic coating of the plant's water reservoir corroded and the reservoir began leaking five liters of water every hour.

Once the reactor was shut down, the core was disassembled and all the fuel elements were laid down in the reservoir's bottom in a horizontal position. The water level was lowered from 7 to 2 meters.

The corrosion in the metallic coating was discovered. Aluminum plates were soldered to the damaged sections. Finally, insulating material was injected to check the remaining corrosion.

The Salazar reactor is of the TRIGA type after the initials of Training Research Isotope Production General Atomic [name in English]. This type of reactor is designed, built, and sold by Gulf General Atomic. The Mark III model installed in Salazar is the most powerful of its kind.

According to the Sole Trade Union of Nuclear Industry Workers, SUTIN, this type of reactor "extremely safe. It is very unlikely that it will suffer an accident."

SUTIN has also pointed out: "The experience gained with this reactor qualifies the personnel who participated (in its repair) and enables them to cope with the Laguna Verde operation."

The director of ININ stressed the reliability of the Laguna Verde operations and their importance for national development.

During his tour of the plant with newsmen and also during a press conference, Bello said that the Laguna Verde works will be ready to resume operations during the first 6 months of next year.

Between 300 and 600 preliminary tests, however, will have to be conducted because authorities are aware that, like in everything related to nuclear development, there are some risks that must be prevented.

Bello reported that the final date to start the plant will be determined by the National Commission for Nuclear Safety and Protection [Comision Nacional de Seguridad Nuclear y Salaguardia].

/7358

CSO: 5100/2056

HEALTH MINISTER COMMENTS ON FOOD RADIATION DETECTION

Dhaka THE BANGLADESH OBSERVER in English 27 Nov 86 p 1

[Text]

Measures so far taken by the concerned authorities to detect radioactive radiation levels in imported powdered milk different varieties of baby food and other food materials, particularly after the Chernobyl nuclear disaster a few months ago are inadequate and faulty. Currently the Atomic Energy Commission of Bangladesh, the lone agency entrusted with the job of detecting the radioactive substances in imported food materials carries out tests of items imported from EEC & some East European countries. Food materials imported from other countries are not under the scrutiny of the Atomic Energy Commission.

Talking to The Bangladesh Observer, Health Minister Salab-

uddin Kader Chowdhury said on Wednesday that food materials including powdered milk and baby food are being examined regularly by the Atomic Energy Commission and all these have been marketed after the clearance certificates from the Commission. The Health Minister said that he himself has received complaints from the members of the public about radiation contamination of powdered milk and food materials imported by Bangladesh. The Ministry is fully aware of the situation and taking utmost efforts to prevent any food materials contaminated by radiation from entering into Bangladesh, he added. The food materials are checked in ships before unloading and till now no food materials with excessive radiation levels have been detected. The Minister categorically said. He however,

admitted that a full proof system could not yet be evolved in the line of Food and Drug Administration (FDA) in the USA and other developed countries to tackle such complicated situation.

An official of the Atomic Energy Commission said that at present the Customs authority is responsible to collect samples of food materials from ships before unloading and send those to the Commission for testing. Samples taken from ships, particularly after the Chernobyl nuclear disaster showed that the radiation levels in those items were much below the permissible marks, he added. The official said that as per International standard 370 becquerel per kilogram of powdered milk for infants is the safest level. And the radioactive substances which is invariably present in all the materials was found much below 370 becquerel per kilogram of powdered milk and other food materials imported from EEC and some East European countries so far tested by the Commission, the official added. He admitted that the method of collecting samples by the Customs officials was faulty as they have no knowledge of radioactivity. In the absence of any regulations, the Commission officials have no access to the ships or the port to collect samples or conduct the radiation testings on the spot.

Another senior official of the Atomic Energy Commission said jokingly that when the effective ways of collecting samples by the Customs officials was put

forward by him, an employee of Customs replied that they are engaged in clearing thousands of radios and other electronic gadgets regularly and as to how they should not have any knowledge of radioactivity coming in to the country without Customs clearance.

Serious problem

The Commission official referred to another serious problem about the checking of food materials coming only from EEC and a few East European countries. He said that there are instances of bottling and packing of milk powder at Singapore in the name of firms based in Australia or New Zealand but the raw materials come from EEC and East European countries which may contain radiation at excessive levels. But these products do not come under scrutiny now he stated.

The Commission official further said that shortage of staff and vehicles are some of the major problems for them to conduct survey on radiation contamination throughout the country which is a must. He also pointed out that doctors and technicians in many of the country's hospitals and health centres handling x-ray equipment are seriously exposed to radiation hazards in the absence of proper safety measures. This needs careful attention by the authorities concerned he added.

The official further said that the Commission was trying hard for the last one decade for the formulation of radioactivity protection ordinance which is in force in India also. Without the ordinance the Commission cannot take effective measures to check and monitor radioactivity in the country, he noted.

/9312
CSO: 5150/0069

LOK SABHA SUPPORTS PLANS FOR NUCLEAR ENERGY DEVELOPMENT

Bombay THE TIMES OF INDIA in English 28 Nov 86 p 9

[Text]

LOK Sabha members of all parties today unanimously supported plans for atomic energy development and assured backing to the government against international pressures for a slow-down in the programme.

The minister of state for atomic energy, Mr. K. R. Narayanan, told the house that adequate precautions had been taken against accidents. There was no cause for worry on that score.

He said the Prime Minister had ordered the cabinet secretariat to prepare contingency plans in case there was an accident.

The minister agreed with the CPI member, Mr. Indrajit Gupta, that it would be short-sighted to abandon the atomic energy development plans merely because of Chernobyl. Mr. Gupta had pointed out that thousands of people had died in the Bhopal gas tragedy but that would not justify closing down the chemical industry.

The real danger, the minister said, did not arise from peaceful use of atomic energy but from putting it to military use. The government's safety measures covered human health, plants and the environment.

Mr. Bhans Pratap Singh (Congress) suggested converting the nuclear power board into a corporation and allowing

it to raise funds from the public by the issue of bonds.

The house passed the atomic energy (amendment) bill.

The atomic bill seeks to make it clear that compulsory acquisition of uranium concentrates by the Centre will not be deemed to be a 'take' for any purpose.

The amendment was described as 'technical' in nature. It would have retrospective effect.

PTI adds: Replying to a discussion on the bill, Mr. Narayanan said, "the nuclear genie is out of the bottle. We cannot put it back. The best thing is to master its use for developmental purposes."

Mr. Gupta, however, cautioned the government not to be 'tempted into a nuclear war race' because of the US helping Pakistan to go nuclear.

This would only divert India's scarce resources from development to non-productive purposes and hamper its growth, he said.

He said there was a renewed pressure to start a nuclear race between India and Pakistan. It would be suicidal.

Mr. S. N. Sinha (Cong) wanted a nationwide debate on the development of atomic energy in view of the Chernobyl accident. The country should also be told how the highly radioactive atomic plants waste would be disposed of, he said.

/12828
CSO: 5150/0065

PAPERS REPORT PASSING OF ATOMIC ENERGY BILL

Minister's Remarks

New Delhi PATRIOT in English 9 Dec 86 p 5

[Excerpt]

Parliament on Monday put its seal of approval on the Atomic Energy (Amendment) Bill, 1986, with Minister of State for Science and Technology K R Narayanan asserting in the Raya Sabha that atomic energy would be used only for "peaceful" and "constructive" purposes even though Indian scientists had "mastered" the technology for making nuclear bombs, reports PTI.

Replying to a debate on the Bill, the Minister said the government had taken all possible safety measures to prevent accidents like leakage of radiation in nuclear plants and the situation was being constantly reviewed.

He said the Prime Minister had already written to the chairman of the Atomic Energy Commission and other concerned officials to discuss in detail further precautionary steps to be taken to avert nuclear disasters.

The bill, earlier passed by the Lok Sabha, vests the Government with powers for compulsory acquisition of minerals for atomic energy while the Government will pay compensation for acquisition of such minerals, including uranium it could not be deemed to be a "sale" for any purpose.

Mr Narayanan said while one could not eliminate the possibility of an accident in nuclear plants in the country the chances were very remote.

He said since the country's first nuclear plant became operational, there had not been a single case of fatality.

"If such a danger arises, it will result in a catastrophe. So we have to take adequate preventive measures."

The Minister said the Chernobyl disaster was not an "ordinary accident" as it was the result of an experiment. Besides, the plant did not have double shut-down devices and certain other contingency measures which had been engineered into the nuclear plants in India.

The Minister said it was necessary to harness nuclear energy to produce the required power by the turn of the century.

Referring to the Bill, he said under the earlier unamended act it had been misconstrued that acquisition of minerals for atomic energy could be

deemed as a sale.

He said the Bihar Government had demanded sales ~~not~~ from the uranium unit in the State. But the Central Government had maintained that it was transfer of minerals between two Government agencies and could not be described as a sale.

Under the amended bill, it has been clarified that compensation for such acquisition would be determined by the cost of production but it would not take into account the value of uranium in its natural state.

MP's Discuss Nuclear Policy

Calcutta THE TELEGRAPH in English 9 Dec 86 p 5

[Text]

New Delhi, Dec. 8 (PTI, UNI): Members in the Rajya Sabha today made a fervent appeal for the revision of the country's nuclear policy in view of the reported acquisition of nuclear capability by Pakistan.

Participating in the debate on the Atomic Energy Amendment Bill, the members, cutting across party lines, drew the attention of the government to the reports of Pakistan having already acquired the capability of making atom bombs and said in view of this, the government must have a "deterrent."

They also called for a comprehensive programme to ensure that there were no radiation leaks from nuclear power plants and for the disposal of nuclear wastes.

Initiating the discussion, Mr R.K. Poddar (CPI-M), said the government should take steps to make use of huge deposits of uranium and thorium found all along the Orissa coast.

Mr V.M. Yadav and Mr P.N. Sukul, both Congress(I), said more efforts should be made to harness nuclear energy. The target of producing 10,000 MW of power from nuclear energy by

the turn of the century should be doubled, they said.

Mr V. Ramanathan of the AIADMK wanted more nuclear power plants to be set up in Tamil Nadu in view of the acute power shortage in the state. Mrs Renuka Chowdhary of the Telugu Desam wanted to know whether the department of environment was consulted before setting up of nuclear power plants and wanted steps to be taken for speedy, scientific and safe disposal of nuclear wastes.

Moving the Bill for consideration, the minister of state for science and technology, Mr K.R. Narayanan, said the Bill makes it clear that acquisition of minerals for atomic energy was compulsory by the government. "Such compulsory acquisition of minerals including uranium shall not be deemed to be sale for any purpose whatsoever," he said. The Bill, —— has already been passed by the Lok Sabha.

Mr Narayanan denied that there was too much of secrecy relating to atomic plants. He said only designs and information about strategic materials were subject to secrecy.

/9312

CSO: >150/0070

PTI COMMENTATOR NOTES NUCLEAR RESEARCH ACHIEVEMENT

BK271400 Delhi General Overseas Service in English 1340 GMT 27 Dec 86

[Commentary by K.S. Jayaraman of PTI]

[Text]

(Text) Early next year, India will be commissioning a new nuclear research reactor fueled by a man-made material derived from the beach sands of Kerala. When built, it would probably be the only reactor of its kind anywhere in the world running on Uranium-233, also known as a third fuel. The reactor named Kamini is in the final stage of construction at Kalpakkam near Madras. The beach sands in the coast of Kerala State in India contain large quantities of thorium, a fertile nuclear fuel. One of the main objectives of India's atomic energy program is to harness this resource for power development. Thorium by itself cannot be burned in a nuclear reactor. It must be converted into Uranium-233 which is a (fission) fuel. This conversion is accomplished by particles called neutrons which are generated inside nuclear reactors.

To produce Uranium-233, a reactor core is surrounded by a blanket of thorium metal and irradiated by neutrons. The irradiated thorium is then removed and the Uranium-233 produced is separated. Separation of Uranium-233 from irradiated thorium is in itself a significant achievement. Through thorium irradiation in existing research reactors, Indian scientists have produced sizable quantities of Uranium-233. Even before the construction of Kamini, scientists in Bombay built a small reactor fueled by a solution of Uranium-233 in the form of uranonitrate. Called Purnima-II, it was commissioned in 1984, but it produced no power. Containing less than 400 grams of Uranium-233 in a zinc alloy vessel of the size of an ordinary milk bottle, it was the smallest reactor of its kind in the world. Various physics experiments carried out using Purnima-II provided the scientists the basic data necessary for building larger reactors using Uranium-233. According to Dr N. Srinivasan, leader of the design team, Purnima-II was the first experimental step in the long-term goal of exploiting the vast reserves of thorium in the country. Kamini which is expected to be in operation in March next year is a successor to Purnima-II.

Unlike Purnima-II, which was a zero power reactor, Kamini will produce 30 kilowatts of thermal power and a flux of 1,000 billion neutrons every second, streaming through a pipe of 1 square centimeter in cross section. This reactor, too, will be surprisingly

small containing only 600 grams of Uranium-233. Unlike Purnima-II, which used a liquid fuel, Kamini will use Uranium-233 in the form of aluminum alloy plates. The core containing the fuel plates will be immersed inside a pool of water surrounded by a concrete vault. According to the Bhabha Atomic Research Center (BARC), the main purpose of building this reactor is neutron radiography. Neutrons, like X-rays, can be used to take pictures of the inside of metallic objects. Kamini, which is a source of high energy neutrons, will be used for radiography of irradiated fuel elements of the fast breeder test reactor already operating in Kalpakkam. The neutrons coming from Kamini will also be used for activation analysis — a technique to detect impurities in alloys — and for general research in radiation physics.

While Kamini will become a new tool for nuclear research, its construction has given the knowledge and confidence for building electrical power producing reactors in the third stage of India's nuclear program. India is probably the only country pursuing a program for exploiting thorium. It is to the credit of Indian atomic scientists that this thorium technology is totally indigenous. The design of Kamini, fabrication of its components control and safety systems were all carried out at BARC itself. India will step up production of Uranium-233 by irradiating more thorium in the fast breeder reactor at Kalpakkam and the recently commissioned Dhruv reactor at Trombay. At the same time, India scientists are exploring the possibility of converting thorium into Uranium-233 by using fusion neutrons and accelerator-produced neutrons. Currently, experiments are being carried jointly by scientists of India and Switzerland to explore this possibility. Indian scientists believe that in the next 10 years, these alternative methods of producing Uranium-233 would become a real source of power.

/12828
CSO: S150/0066

NARORA NUCLEAR PROJECT ALMOST TOTALLY INDIGENOUS

Calcutta THE STATESMAN in English 12 Dec 86 p 11

[Text]

NEW DELHI, Dec. 11.—A near-total indigenous content characterizes India's fourth nuclear power project which is nearing commission at Narora in Bulandshah district of U.P. A level of 93% indigenization has been achieved and the balance is of seven per cent restricted generally to import of raw materials.

This was disclosed by Mr K. N. Chopra, Project Director, Narora Atomic Power Project during the recent visit to the nuclear plant by members of the Confederation of Engineering Industry.

He stated that there has been a progressive pace of indigenization of nuclear engineering capabilities since the start of the first nuclear reactor with U.S. assistance at Tarapur followed by Canadian technology at Kota.

From a 79% level of indigenization at Rajasthan atomic power project, Kota, to about 90% at the Madras Power project at Kalpakkam, the Narora plant has come closer to a 100% indigenous capability. The leading industrial organizations

which have been associated with the project are the Walchandnagar Industries, Larsen and Toubro, BHEL, Kaveri, ECIL, BHIPV, Kirloskar, K. G. Kedia Compressors, Hindustan Brown Boveri, Voltas, Pricco India, Godrej and KSB Pumps.

The first unit of the 220 MW plant at Narora, which is to go critical by December 1987, has all the critical components such as end-shields, turbo generators, fuelling machines, instrumentation and control equipment, as well as conventional equipment, supplied by indigenous manufacturers, according to Mr Chopra.

The entire engineering construction, erection and commissioning has been provided by local engineering construction industry.

The unique feature of the Narora atomic project is that for the first time the designing is totally indigenous, standardized and aimed at bringing about a rationalization and uniformity in equipment requirement for the future 14 reactors of 220MW, starting from Kakrapara (Gujarat) onwards.

The Narora design concept, for the first time, has been designed to enable upgrading or scaling up of operations for the future requirement of nearly 10 reactors of 500 MW proposed by Department of Atomic Energy. This would

greatly facilitate the engineering industry to work out quicker delivery schedules in meeting the target nuclear power generation capacity of 10,000 MW by the year 2000 A.D.

/9312
CNO: 5150/0071

BRIEFS

FIRST NEUTRON REACTOR--India's first neutron reactor, now being built at the India Gandhi Centre for Atomic Research at Kalpakkam, is expected to go critical by March next, making a new milestone in the country's nuclear programme. When commissioned, the reactor named 'Kamini', using uranium 233-aluminium alloy as fuel, designed and fabricated indigenously, will be the first of its kind in the world, scientists at the centre say. The reactor will be used for neutron radiography of fuel pins and sub-assemblies, critical components such as control valves, characterisation of materials and material development. It could be used for radiation physics studies as well. Uranium 233 used in the fuel has been derived from thorium available abundantly in the country. Thorium rods have been irradiated at the Cirus reactor at Trombay to derive uranium 233. The alloy fuel as also the berilium oxide reflector modules are being fabricated at the radio-metallurgy division of the Bhabha Atomic Research centre, Bombay. Reflector modules which surround the reactor core prevent the escape of neutrons. Designed to operate at 30 kW nominal power, the reactor could be scaled up to 100 kW. Once charged, it could go up to four to five years depending on operation. [Text] [Madras THE HINDU in English 5 Dec 86 p 12]/12828

NUCLEAR POWER SOUGHT--The need for atomic power projects in Madhya Pradesh has been stressed by Mr. D. S. Tiwari, Chairman of the State Electricity Board. Suitable sites have been already proposed at Bargi near Jabalpur and Atraipur near Sheopuri. Dr. Raja Ramanna, Chairman, Atomic Energy Commission, who recently toured the State on the invitation of the Government, said India had plans to install 32 reactors to generate 10,000 MN of power in the next decade. He said the design of nuclear power stations in the country were safe and the radiation hazards minimal. [Text] [Madras THE HINDU in English 5 Dec 86 p 12]/12828

'MOST DANGEROUS' PLANT--The Tarapur atomic power plant, located about 100 km from Bombay, is the "dirtiest and most dangerous" such plant in the world, according to Dr. William Caldicott and Dr. (Mrs.) Helen Caldicott, who have launched a world-wide campaign against nuclear arms race. The two, who are on a four-week tour of India, said today that the Tarapur plant had the worst type of radioactive contamination and workers were exposed to it. They said the pipes conducting radioactive water to the plant were discarded after some time but not destroyed. Farmers in the area had been using these pipes for irrigating their crops and this was dangerous. The effects would show after ten to 20 years. They said the defects in the Tarapur plant had been

pointed out by no less a person than the General Electric Company expert, Mr. Briden Paugh, but appropriate safety measures had not yet been taken. [Text][Bombay THE TIMES OF INDIA in English 3 Dec 86 p 9]/12828

PAKISTAN SMUGGLING URANIUM--The Government's attention was drawn in the Lok Sabha on Friday to alleged smuggling of uranium from Bihar to neighbouring Pakistan, reports UNI. Raising the issue during zero hour, Mr Shiv Prasad Sahu (Cong) said it was a very serious matter especially as Pakistan was trying to manufacture a nuclear device. He wanted the Government to take immediate steps in checking this menace and come forward with a statement. [Excerpt][New Delhi PATRIOT in English 22 Nov 86 p 5]/12828

RADIOACTIVE WASTE STORAGE--The Bhabha Atomic Research Centre (BARC) is studying the possibilities of storage of radioactive waste in deep geological formation. An interim storage facility is being set up at Tarapur, Mr Narayanan said in a written answer. He said the radioactive waste management had been studied by the BARC for more than two decades and very strong capabilities have been generated. [Text][New Delhi PATRIOT in English 5 Dec 86 p 5]/12828

URANIUM SMUGGLERS ARRESTED--Ranchi, Dec 12--A gang of uranium smugglers has apparently been busted by the Jamshedpur police with the arrest of six persons in and around the city. On a tipoff, Parsudih thana laid a trap for an alleged smuggler, whose name was given as Mannu alias Manoj Das of Potka. He was supposed to sell a one kg packet of uranium to some persons at Sarjamda on Shankarpur Road. Manoj and another Sashidhar Das were caught with a rexin packet allegedly containing uranium. On the packet was printed the words "uranium pure 100 percent, weight 1 kilogram, 134/86 made in India UCIL". A sample bottle of uranium was stated to have been recovered from Manoj. From the residence of Manoj Das' brother Bablu Das, police recovered a bag containing about 60 grammes of uranium and arrested Bablu Das and three more persons. Police were told that the smuggled uranium was taken to Calcutta from where it was sold to Bangladesh, Pakistan and China. Smugglers from these countries sent their representatives to collect the quantities. Police believe there is an organised gang to smuggle uranium from Jadugora mines in Singhbhum near Jamshedpur. That there is an active gang operating for some years now in this belt to smuggle uranium extracted by the Uranium Corporation of India Ltd, (UCIL) Jaduguda, Singhbhum, was evident from reports sporadically coming in of seizure of uranium from various parts of the State, but somehow the cases were dropped. A journalist who edited a Hindi daily from Jugsalai (Jamshedpur) was brutally murdered years ago and the tongue of his wife was cut by the smugglers one night after he published an expose on the gang. [Text] [Madras THE HINDU in English 13 Dec 86 p 6] 9312

FRENCH NUCLEAR TEAM--Madras Dec 10--A 35-member trade delegation from the French nuclear power industry visited the nuclear power station and the prototype fast breeder reactor at Kalpakkam on Monday. The delegation, which came to India last week, is exploring the scope for technical cooperation with the Indian nuclear power industry. The leader of the delegation, Mr Marc Bodineau, told newsmen, after the visit to Kalpakkam, that the Indian industry had the technical capability to manufacture about 60-80 percent of a nuclear plant. But the question was whether it could deliver the goods within the time fixed by the Department of Atomic Energy. Besides discussions with the officials of the Department of Atomic Energy, the delegation met industrialists and manufacturers of components for the Indian nuclear

programme, Mr Bodineau said. He hoped the visit would lead to collaborative ventures. The delegation later met city industrialists at a reception hosted by the Honorary Consul for France, Mr K.R. Gopalan. [Text] [Madras THE HINDU in English 11 Dec 86 p 12] 9312

GROUP OF 6 URGES TALKS--The leaders of the 6-nation 5-continent peace and disarmament initiative have called upon the superpowers to start comprehensive talks as soon as possible next year to eliminate nuclear weapons. In a statement on the eve of the new year, the leaders of Mexico, Argentina, Sweden, Greece, Tanzania, and India said there was no justification for nuclear testing by any country. They appealed to the United States to reconsider its policy on nuclear testing so that a bilateral moratorium can be established. The statement noted with regret the recent announcement by the Soviet Union to terminate its unilateral moratorium and to resume nuclear testing following the first U.S. test next year. The joint statement was released simultaneously in all the six capitals. [Text] [Delhi Domestic Service in English 0240 GMT 30 Dec 86 BK] /9274

CSO: 5100/4712

MEASURES TAKEN TO PROTECT NUCLEAR PLANTS

BK050325 Islamabad THE MUSLIM in English 23 Nov 86 p 1

[By Saeed Qureshi]

[Excerpt] Islamabad, Nov 22: President Ziaul Haq Saturday unequivocally declared that Pakistan has taken all the requisite measures to protect its nuclear installations against attack from any quarter.

The President said this while commenting on the Iraqi delegate's observation to the effect that Pakistan, in the backdrop of the attack on Iraqi nuclear reactor by Israel, should be on guard against the possible onslaught by her enemies.

The President was replying to questions of the mediamen in his chamber in the State Bank Building, on the conclusion of the third meeting of the OIC [ICO] Standing Committee on Scientific and Technological Cooperation [Comstech].

In reply to a question concerning the Iranian delegate's desire for cooperation with Pakistan in nuclear, medicine, agriculture and other fields of development, President Zia offered such cooperation to all the member countries of the OIC including Iran.

He disclosed that some of the Islamic countries were already benefiting from Pakistan's achievements in the nuclear domain, which were purely for peaceful and developmental purposes.

The President expressed Pakistan's unconditional willingness for sharing nuclear potential and capabilities with the OIC member countries for the common good of the nation. [passage omitted]

/9274
CSO - 5100/4719

JUNEJO URGES LOCALLY MADE NUCLEAR EQUIPMENT

BK050355 Karachi DAWN in English 22 Nov 86 p 1

[Excerpts] November 21: Prime Minister Mohammad Khan Junejo has directed the Pakistan Atomic Energy Commission (PAEC) to fabricate locally the equipment and spares required to advance the peaceful nuclear programme of the country.

He was talking to the Chairman and scientists of PAEC during his visit to the exhibition "Atoms for Development Expo 86" at Ferozepore Road here on Friday [21 November].

Punjab Governor Makhdoom Sajjad Hussain Qureshi, Chief Minister Nawaz Sharif, provincial ministers, WAPDA (Water and Power Development Authority) Chairman and Speaker of the Punjab Assembly were prominent among the visitors.

The PAEC Chairman, Munir Ahmed Khan, told the Prime Minister that the Commission had already acquired know-how to develop locally a number of spares used in the Karachi nuclear power plant. The locally manufactured spares, he added, cost only one-fourth of the cost of imported ones and thus the Commission was saving millions of rupees every year.

The Prime Minister was shown around all the stalls at which specimens of the achievements of the PAEC in the fields of agriculture, medicine, minerals and energy have been put on display.

Medical Centre: On a question by the Prime Minister, the PAEC Chairman told him that the Commission would set up one nuclear medical centre at Abbottabad and a second one at Karachi. The nuclear medical centre being constructed at Quetta would be completed during the next six months and was expected to start functioning by April next year, the Chairman said. [passage omitted]

Uranium Deposits: The Prime Minister was also briefed about the occurrence of uranium deposits in various parts of the country and how the Commission was exploring, refining and processing this mineral for use in the atomic reactor.

On another question by the Prime Minister, the Chairman PAEC said uranium was also found in Baluchistan.

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CSO: 5100/4719

PAKISTAN TIMES ON INDIA'S NUCLEAR CAPABILITY

BK021230 Islamabad THE PAKISTAN TIMES in English 23 Dec 86 p 4

[Article by Farhatullah Babar: "India Enhances Nuclear Option"]

[Text] Last month the All India Radio quoting the Chairman of India's Atomic Energy Commission Dr Ramanna disclosed for the first time that India had achieved uranium enrichment at its nuclear research centre in Trombay near Bombay. The report did not specifically mention whether the degree of enrichment achieved was high enough to permit its use for making nuclear weapons or it was of low grade for use in certain types of reactors such as the one at Tarapur in India.

However, this is not very important as Dr Ramanna himself discounted this aspect by saying that the line between weapon grade and reactor grade fuel was very thin and could be crossed any time by merely increasing the stages of enrichment.

So the cat is out of the bag and what was generally speculated by nuclear experts has been confirmed by no less a person than the chief of atomic energy commission himself. In fact, in retrospect it seems logical for India to have undertaken indigenous enrichment soon after the Pokhran explosion of May 1974 when the U.S. cut off supplies of nuclear fuel for the Tarapur atomic power station. It should have become obvious to us when Prime Minister Morarji Desai declared in the Lok Sabha on March 23, 1978 that he would "strain every nerve to see that the Tarapur station does not close down." Indeed Morarji Desai's ambiguous statements apparently foreclosing India's nuclear option and diluting his country's stand on the NPT [Non-Proliferation Treaty] were intended more to buy time for making indigenous nuclear fuel than any genuine desire to help stop proliferation. A *Times of India* report two years ago also revealed that India made enriched uranium in 1982 but has not announced it publicly. It should have been easily deducable from all these indicators that India would soon complete this missing link of the nuclear fuel cycle.

From the stance taken by India on various nuclear issues and its stubborn refusal to accept international safeguards on its nuclear installations, it should have been obvious to understand India's intentions long ago. Nuclear experts have all along believed that India's programme for uranium enrichment through centrifuge was initiated

by Mr Sarabhai, the then chairman of the atomic energy commission in early 70's, as part of a comprehensive nuclear power development programme known as "Sarabhai Profile." India refrained from talking about it until some five years ago Sarabhai Sarabhai's successor De Sethan disclosed in a Press

conference that India had abandoned search for uranium enrichment through centrifuge as it was not cost-effective. It is said that too many centrifuge machines broke during operation obliging India to abandon this project.

However at that time Sethna did not say whether India was experimenting with other enrichment techniques as it is now obvious that search for indigenous fuel had not been abandoned. The world was told only a half-truth and an impression sought to be created that India was not making the fuel at all although in effect only a certain method had been discarded. Prime Minister Morarji Desai's public pronouncements not to conduct nuclear explosions "under any circumstances" and President Carter's statement that Morarji Desai's declarations had helped clear misunderstandings further reinforced this impression. But behind professions of pious hopes and vague promises India was actually pursuing other methods for enriching uranium. Some people think that India may have secretly developed laser enrichment technology but this discussion is merely of academic interest and does not make any difference to India's actual capability.

The news about India making enriched uranium is most disturbing for prospects of non-proliferation and constitutes a serious set-back to efforts aimed at making South Asia a nuclear free zone. It knocks down yet another technical constraint and enhances India's nuclear option. It was perhaps this perception of enhanced option which prompted Rajiv Gandhi to threaten use of nuclear option at a state banquet in New Zealand last month "if any country in the region went ahead to produce nuclear weapons." He also declared that India was fully capable of producing nuclear weapons.

The world in general and Pakistan in particular has to prepare itself for the fall out of this new reality which is more ominous

and far reaching than the explosion of 1974. A warning of the likely fallout was sounded in a study recently carried out by the Carnegie Endowment for International Peace thus: "India's nuclear weapons capability has increased by more than 1000 percent (since it first exploded a nuclear device). It now has a completely un safeguarded nuclear fuel cycle. One would hope that this is simply option building. But the new rhetoric of Rajiv makes one concerned. We are seeing an increase in the capability of India as well as a change in policy." This change in policy may be nothing but the transformation of nuclear option into weapons.

India thus has improved upon its nuclear option without actually carrying out another nuclear explosion. Its implications are that it can continue to refuse to sign the NPT, reject all safeguards, 100% international inspection of its nuclear programme, and at the same time impress upon the world that it is doing so only to keep pressure on nuclear powers to agree to ban nuclear weapons in line with its declared policy on disarmament. Rajiv will thus have additional levers of a marked improvement of nuclear option and an enhanced credibility on issues of disarmament. It will be no wonder if he uses these levers to counter our claims and sabotage Pakistan's peaceful nuclear power programme.

The international community has to take serious note of this development and take effective measures to stop India from exercising its nuclear option as threatened by Rajiv. In 1976 France reneged on its agreement with Pakistan for the supply of a reprocessing plant because of imaginary fears of proliferation whipped up by India's nuclear explosion, although the proposed plant was to be under stringent international safeguards. Now in the light of a real threat from India to exercise nuclear option will France reconsider its existing agreement with India for the supply of nuclear fuel? Will the U.S. be willing to exert moral and political pressure on India to either accept Pakistan's four-point proposal for making South Asian subcontinent a nuclear free zone or at least come out with its own counter proposal. The world must realize that the goal of non-proliferation has been pushed back further and may well become in achievable if urgent remedial measures are not urgently taken.

Internally also we should make an honest assessment of our priorities and policies and determine a proper response to the Indian challenge. India is no longer decades behind us in the field of uranium enrichment. We must stop sustaining ourselves on illusions and never lose our perspective.

Any response to the Indian challenge must be total encompassing all fields whether technological, social or political. Our scientists have demonstrated great capabilities but we must not do or say anything which will invite criticism of our programme, create hurdles in our way and provide a ready excuse to India to realize its nuclear option.

Indeed the propaganda against us has been cleverly used by India to advance its option quietly. It seems that Rajiv has faithfully followed the advice given recently by a well known Indian military strategist and thinker K. Subrahmanyam. Says he: "The Indian objective should be to use Pakistan's overt nuclear declarations to justify its own programme. At the same time our official policy at the highest level should continue to reiterate that India will not consider the use of nuclear energy for purposes other than civilian." This indeed is very significant and should serve as an eye opener.

PAKISTAN

BRIEFS

WEAPONS DEVELOPMENT EFFORTS ALLEGED—New Delhi, 24 Dec (TASS)—By TASS correspondent Sergey Karmalito—Taking advantage of Western connivance, the Islamabad regime endeavors to develop nuclear weapons of its own. THE HINDUSTAN TIMES reported today that Pakistan was trying, through American, West German, British and French companies, to obtain large lots of high-grade graphite which was used in nuclear reactors to produce plutonium. The paper said that was further evidence that Islamabad was definitely out to build the A-bomb. THE HINDUSTAN TIMES quoted Western experts as saying they knew for certain that the Pakistani nuclear research center at Kahuta was now capable of enriching Uranium-235 to the 90-percent grade needed to build nuclear weapons. The well-informed Bombay-based weekly BLITZ said Pakistan had obtained the technology of producing Uranium-235, components of explosive devices used in nuclear weapons, specialty steel and various equipment for nuclear facilities in the United States, Britain, West Germany and France. [Text] [Moscow TASS in English 1744 GMT 24 Dec 86] /9604

CSO: 5100/4711

SOUTH AFRICA

ICE-FILLED CLOTHES FOR KOEBERG'S DIVERS

Cape Town WEEKEND ARGUS in English 8 Nov 86 p 22

[Article by Mark Stansfield]

[Text] When Charles Maxwell is asked to do his job it takes him about an hour to get dressed and his boss sometimes makes him wear ice-filled underclothes.

It also took him a year to learn what to do.

This doesn't mean that Charles is lazy, stupid or reluctant to report for duty.

He is Koeberg's official nuclear diver. He dives into pools of low dosage radioactive water in the nuclear reactor cavity and spent fuel pools of the nuclear power station. It's the closest any humanbeing ever comes to the radioactive fuel rods with the minimum of protection.

Fuel Rods

Charles swims in the liquid which protects other employees from the radiation emitted by the fuel rods and by performing his task he is protecting other workers from the hazards of nuclear radiation because without him Koeberg would be forced to drain the pools to carry out maintenance, possibly exposing more people to radiation.

The water he enters inside the heart of South Africa's nuclear power-kingdom glows a beautiful deep blue--a science-fiction fantasyland of crystal-clear water and clinically-clean stainless steel illuminated by powerful underwater lights.

"It is a truly beautiful, awesome sight under there," said Charles.

Charles Maxwell and co-diver, Denis Rattey, are down-to-earth men who do not seek publicity and are scared that their job will be seen as some kind of hero task.

"There's nothing really dangerous or spectacular about what we do," said Charles.

"It took us a year to practice the techniques and every conceivable safety precaution was taken.

"The two main objectives in nuclear maintenance are to reduce radiological exposure while performing a maintenance task and to reduce plant downtime.

"One method of accomplishing this is by underwater nuclear maintenance," he said.

It is heartening to be told that even in this nuclear machine-age there are still tasks that a man can perform better than a machine.

"In at least one area in this nuclear age man is displacing the machine," Charles said.

"Simple but tedious and time-consuming inspections, maintenance, and repair work formerly carried out by costly and sophisticated remote controlled tools, video recorders and mirrors visual aid systems, have been completed by divers with great savings in plant downtime and radiological exposure.

"Water is used specifically to act as a radiation shield and work that would have entailed draining the area--greatly increasing the radiological exposure to workers--can be done quickly and safely using divers," he said.

Ice-Filled

The actual diving conditions encountered by the nuclear divers at Koeberg are near perfect with good lighting, "excellent" visibility, no currents, shining stainless steel fittings and warm water.

The only two limiting factors, according to Charles, are the exposure to radioactivity and the water temperature which can exceed 40°C--and that is why they sometimes wear ice-filled vests.

Detailed safety procedures are followed before and after every dive.

/9365

CSO: 5100/21

TIGHTER NUCLEAR CONTROLS TO BE INTRODUCED

Johannesburg BUSINESS DAY in English 19 Nov 86 p 9

[Text]

TIGHTER controls in the event of a nuclear accident in SA and extended powers for the Atomic Energy Corporation — including the appointment of a chief executive officer — are to be introduced.

In terms of the Nuclear Energy Amendment Bill, which was released in Cape Town yesterday, the Atomic Energy Corporation will have complete power to define a particular period and area in the event of a nuclear accident.

In existing law, the Corporation could only define periods and areas of nuclear accidents if the Minister of Economic Affairs and Technology deemed it necessary.

The Corporation's inspectors, who are required to check that all nuclear plants in SA comply with their licences — which lay down safety measures — will now have the full power to order articles or objects to be tak-

en away for investigation. In existing law, only the Corporation has this power.

The objects of the Corporation will also be extended to include the development, promotion and availability of nuclear technology and related expertise.

The Corporation's new chief executive officer will sit on its board.

In a memorandum, which was attached to the Bill, government said the Atomic Energy Corporation had recommended the proposed amendments.

The memorandum gave no other reasons for the changes, but they are clearly aimed at giving the Corporation tight control over the licencing — including safety measures — of nuclear plants in SA.

/9365
CSO: 5100/21

POSSIBLE SITES IDENTIFIED FOR NUCLEAR PLANTS

Johannesburg BUSINESS DAY in English 25 Nov 86 p 3

[Text]

ESCOM has identified 19 possible sites for future nuclear power stations — all of them on the Cape and Natal coasts.

The utility company is conducting preliminary studies on sites on the south coast from Gansbaai to Agulhas; on two small regions east and west of Port Elizabeth; and on a large region of the west coast starting just north of St Helena and stretching up most of the West coast to within 100km of Namibia.

Manager of the Atomic Energy Corporation (AEC) geotechnology department, Dr P D Toens, yesterday said that although it was still too early to make definite statements about the site of SA's next nuclear power station, from a geological point of view the Gansbaai to Agulhas section of the coastline was probably

the "most feasible".

The AEC is to open an office in Gansbaai in January as a base for investigations into likely sites in the area.

Other possible sites are situated in a small section of the Natal coast about 100km north of Durban. They are also under preliminary investigation but are considered less promising because of the region's high population density.

Disclosing details of Escom's R13m search for a new nuclear power station site, spokesmen said all studies were in a very early stage.

Intensive investigations into all possible sites would, however, be completed by 1991 — at which time Escom could begin to consider the acquisition of desired sections of

coastline.

Toens warned the public against property speculation in the areas identified for a possible nuclear power station:

"For one thing, we are not yet confident that any one of the 19 specific locations identified so far might be the site for a new nuclear facility. And for another, such a facility would require only 3km of coastline, making the chances of someone buying up just the right property very remote indeed."

□ The first batch of radioactive waste from the Koeberg nuclear power station was transported to Vaalputs in the northern Cape yesterday.

Mineral and Energy Affairs Minister Danie Steyn said the waste would be buried in 10m-deep trenches.

/9365

CSO: 5100/21

SOUTH AFRICA

ESCOM POSTPONES DECISION ON LOCATION OF NUCLEAR REACTOR

Cape Town DIE BURGER in Afrikaans 26 Nov 86 p 11

[Article by environmental reporter: "19 Sites Investigated. Escom Says Later on Nuclear Plant"]

[Text] A decision will not be able to be made in the next five years on where South Africa's next nuclear power plant is going to be erected. Escom by no means has its eye specifically on the area between Gansbaai and Agulhas as the site where it wants to build its next nuclear power plant. Mr Etienne du Plessis, Escom's chief public relations officer, assured DIE BURGER of that yesterday. DIE BURGER had approached Mr Du Plessis for comment after the impression was created in certain newspapers yesterday that it was probably only a question of time before Escom began to build South Africa's next nuclear power plant along that part of the coast. "Escom has sufficient power-generating facilities to furnish our future needs."

Decision

"However, more nuclear power plants will have to be built in the next century for several reasons, such as the availability of water, the exhaustion of coal reserves suitable for generating power, the possible high costs associated with the fight against pollution by coal power plants, and the more efficient distribution of power-generating installations throughout the country. The site between Gansbaai and Agulhas, which is now being investigated, is but one of 19 sites along the South African coast which are now being investigated and are yet going to be investigated. The investigations will probably be finished in about five years. No decision can be made on where the next nuclear power plant is going to be before the investigations are finished."

Public

"Even if investigation shows that the site in question is suitable for erecting a nuclear power plant and the property is purchased, it still does not mean that a nuclear power plant will be built there, because other sites may be more suitable." Mr Du Plessis also gave the assurance that the public will be informed in every phase -- from the preliminary investigation for suitable sites for erecting nuclear power plants to the construction of such plants.

13084
CSO: 5100/15

SOUTH AFRICA

BRIEFS

RADIATION FOUND IN KOEBERG SLUDGE--Cape Town--Minute traces of radiation have been found in sewage sludge at Koeberg nuclear power station. An Escom spokesman yesterday confirmed the discovery and said that it would be traced back and dealt with. He said it was about one-thousandth of the reportable level--"we are talking about fractions of 1 millirem." It had appeared in sludge from the station's own sewage-treatment system. "To put it into perspective, the normal background level of radiation in Cape Town would be about 100 millirems a year and Koeberg has been averaging radiation to the outside of about 0.5 millirems a year." The millirem is a measure of the biological effect of radiation--SAPA [Text] [East London DAILY DISPATCH in English 31 Oct 86 p 5] /9365

NUCLEAR SAFETY COUNCIL NEW CHAIRMAN--The dean of engineering at the University of Cape Town, Dr John Martin, has been appointed chairman of the Council for Nuclear Safety for a three-year term. The council acts as a watchdog on safety at nuclear installations. It reviews the work of the licensing branch of the Atomic Energy Corporation, which lays down the conditions under which a nuclear licence can be granted. No licence can be granted without the council's consent. The council may also choose to investigate issues of nuclear safety and make recommendations to the Minister of Mineral and Energy Affairs. [Text] [Cape Town THE ARGUS in English 11 Nov 86 p 4] /9365

CSO: 5100/21

USSR

USSR: PENTAGON SAID TO ACTIVELY SUPPORT DIMONA

Moscow IZVESTIYA in Russian 9 Oct 86 p 4

[Article by V. Lashkul: "Israel: Ambitions Are Growing"]

[Text] Beirut. (IZVESTIYA'S own correspondent). From reports of the Lebanese mass media, Tel Aviv intensively builds up nuclear potential.

As the newspaper (REVEI) notes, Israeli officials refused to comment on the information of the British weekly SUNDAY TIMES concerning the program for the creation of their own nuclear weapons. However, facts leaked to the press confirm that the Zionist state is developing the most fearful weapon of destruction at accelerated rates. In exchange for nuclear technology and various military equipment given by Tel Aviv to the racist regime of the South African Republic, Pretoria is supplying Israel with uranium ore. Plutonium is already being produced in secret reactors in the populated places of Dimona, (Yavne), and (Nakhal-Sorek) which were constructed with the assistance of the United States and other NATO countries.

The Pentagon is rendering active support to the Tel Aviv extremists. Several hundred Lance missiles capable of carrying warheads with a nuclear charge have been delivered to Israel from across the ocean. The United States is also providing its strategic ally in the Near East with contemporary Phantoms. Now Tel Aviv is soliciting deliveries of American Pershing missiles. The question of Israel's participation in the Reagan "Star Wars" plans has been practically decided.

The militaristic preparations of Israel, which has demonstratively refused to sign the treaty limiting the spread of nuclear weapons, causes the legitimate concern and indignation of the Arab community.

6367

CSO: 1801/41

PAKISTAN NUCLEAR WEAPONS PROGRAM EXAMINED

Moscow SELSKAYA ZHIZN in Russian 5 Oct 86 p 3

[Article by V. Kosovyan under the rubric "International Notes": "Straining for the Atomic Bomb"]

[Text] As the Indian newspaper HINDUSTAN TIMES reports, Pakistan is continuing its nuclear preparations and, starting in 1987, will be able to produce atomic weapons. Citing the opinion of experts in that field, the newspaper notes that lately the Islamabad regime has been urgently attempting to find channels for purchasing special grades of steel abroad for the manufacture of centrifuges that are used for the enrichment of uranium. In this connection it is counting on expanding its existing production base at its nuclear center in Kahuta and obtaining the necessary quantity of fissionable materials.

The London newspaper FINANCIAL TIMES calls the plant in Kahuta the nerve center of the Pakistani nuclear program. And this is by no means an exaggeration. According to figures in the Indian press, this is the plant at which work on the enrichment of uranium has been going on since 1978. Pakistan can obtain up to 10 kilograms of enriched uranium there. This is enough to manufacture two bombs a year starting in 1987. The HINDUSTAN TIMES believes that Islamabad has already successfully tested a detonator for a nuclear charge at the plant in Kahuta.

A question arises: How can Pakistan, which is torn by internal contradictions and burdened with a foreign debt of \$13 billion, carry out such a costly nuclear program? Where are Pakistani physicists and engineers getting the nuclear technology? The tracks lead to the West--to Europe and, beyond, across the ocean to the United States and Canada. Thus (Abdul Kadir Khan), who is known as the father of the Pakistani atomic bomb, works at the Kahuta plant. He studied in Belgium and worked in Holland at a plant in Almelo. There he borrowed drawings and, through sham firms, purchased equipment on the basis of his lists.

One gets the impression that Western firms have not been doing much to block Pakistani agents from purchasing equipment for their nuclear developments. And when secrets become known, the guilty parties get off with light punishments. Thus, the Pakistani spy (Nazir Ahmed Vaid), who had engaged

in acquiring 50 krytrons, triggers for nuclear charges, was arrested in the United States. [Vaid] and his confederates, to all intents and purposes, escaped punishment. His confederates were freed entirely, and [Vaid] was deported to Pakistan. The scandal was hushed up in the United States, and the President of Pakistan stated that what was involved was the purchase of flashers for special motor vehicles! The persistence of the Pakistani emissaries did not go unnoticed by the West German press, either. The magazine STERN believes that "with the help of its diplomats and shady dealers Pakistan is acquiring equipment for its own first nuclear bomb."

American laws, in particular the "Symington amendment," forbid the granting of American aid to countries that are creating nuclear weapons. This ban is easily circumvented in the granting of U.S. military aid to Israel. People in Washington are not inclined to pay it any attention in the case of Pakistan, either. Assurances concerning the peaceful nature of the Pakistani nuclear program were given by the head of the Pakistani government during his visit to Washington at precisely the time when the fate of a new, second program of military assistance to Pakistan worth \$4.02 billion was being decided. As in the conclusion of the first, \$3.2 billion deal, the American administration "believed" the peaceful assurances of the Pakistani representatives in order to calm down public opinion.

The unique game between Washington and Islamabad over the Pakistani nuclear program is also attributable to the fact that the United States is a coauthor of the Treaty on the Nonproliferation of Nuclear Weapons. In accordance with Article I of that treaty, it is not supposed to transfer nuclear weapons or other nuclear explosive devices, or control over them, to anyone, either directly or indirectly. Such treaty commitments in no way accord with the circumstance that among other weapons, Islamabad receives F-10 fighter-bombers, which are capable of carrying nuclear charges, from Washington.

Obviously, it is by no means always possible to pass off wishes for reality. Nor is it possible to totally deny the facts indicating that Pakistan is drawing near to the "nuclear club." This is why Washington keeps making assurances that deliveries of so-called conventional weapons will prompt Pakistani generals to abandon the development of nuclear weapons.

It is known that American-Pakistani military cooperation has continued for more than one decade now. The new deal is intended to last until the end of 1993. And during this time Pakistan is rapidly approaching the possession of nuclear weapons. Such is the mutual payment for the pro-American course that Islamabad follows both against Afghanistan and against India. And the Pentagon needs its military bases on Pakistani territory right now for its military preparations in the Indian Ocean basin.

8750
CSO: 5100/012

SPAIN REPORTEDLY PROVIDES FRANCE WITH PLUTONIUM

Madrid TIEMPO in Spanish 17 Nov 86 pp 58-68

[Excerpts] The Vandellós I nuclear power plant in Tarragona has been producing plutonium 239 for 14 years, which France uses for its nuclear bombs. But in recent years, the French have been slow in removing the irradiated fuel, which creates safety problems for Spain's nuclear facility. The CSN [Nuclear Safety Council] has been reporting incidents at the plant for the past 3 years, apparently due to these delays.

Several times a year a special train leaves the Vandellós I nuclear power plant, 40 kilometers south of Tarragona, carrying a deadly cargo. The fuel used in the reactor is sent to the French facility at Marcoule, near Nice, where it is reprocessed. From this they obtain part of the plutonium 239 which the French military use for nuclear testing in the Pacific.

Since 1972, the year when Vandellós I began to operate, the shipments have taken place approximately 6 times a year. But recently the French have been slow in taking out the irradiated fuel, thus creating serious safety hazards at the Spanish plant.

Successive 6-month reports which the CSN has sent to the chamber of deputies and the senate cite incidents which occur periodically at Vandellós I because of this problem. The delays in the removal of spent fuels stored in the cooling pool causes the cladding surrounding the fuel elements to break, and this leads to repeated radioactive leaks.

This was at least the conclusion CSN specialists reached at the end of 1983 about the "increased activity in the pool waters." The report which the Council sent to congress a few months later stated that "there may exist a relation between these breakages and the prolonged storage of fuel elements in the pools. Consequently, the CSN has ordered an increase in the frequency of shipments of irradiated fuel elements to France, so that they will not remain in the pools for more than 8 months."

Periodic Incidents

But the requirements imposed by the Nuclear Safety Council seem to be of little avail. In almost all the reports the CSN has issued to deputies and senators from that time until the present, the breakage of the fuel housing appears to be an ongoing problem.

The latest public report which mentions this problem covers the operation of the plant during the first half of last year. Last February the radioactivity in the storage pool waters was 2 times higher than its normal values. This was caused, stated the report, "by leaks in the shutoff valves of a case containing elements with broken cladding."

The CSN reports to parliament are usually issued nearly 3 months after the time being reported on. For this reason, it is hard to say what has been happening most recently at the Vandellós I facility. The public criticisms made by environmental groups state that the problem remains unresolved. There has been absolute silence on this topic from the plant itself.

Vandellós I is Spain's only nuclear power plant of the graphite-gas type; it is similar to the Soviet plant at Chernobyl. In addition to generating electricity, these reactors also produce military-quality plutonium, which can be used for military purposes.

7679

CSO: 5100/2415

EFFORTS MADE TO SELL MOTHBALLED ZWENTENDORF NUCLEAR PLANT

Aurich NEUE ZUERCHER ZEITUNG in German 6 Nov 1986 p 15

[Article by Inge Santner: "A Beautiful Example of Useless Technology"]

[Text] The Fruits of Chernobyl

The Austrian Government spent 7 years trying to activate the Zwentendorf nuclear power plant. In the winter of 1985-86 the nuclear lobby thought it had won: According to a poll, 62 percent of those interviewed were said to have voted in favor of nuclear power. But then Chernobyl happened. The mood reversed itself. Sinowitz and his successor Vranitzky decided to put the reactor on the block. To date, there have been no takers.

The bargain basement deal of the century is now official. Austria is offering an unprecedented buying opportunity--a clearance sale on a mint-condition nuclear power plant. But nobody is interested. Even Switzerland has said "thanks just the same."

The item in question is the Zwentendorf reactor located west of Vienna. Completed in 1978 and never used, it is a lovely example of technology that has become obsolete. It is available for purchase as a whole or in single components--either way, considerably below cost.

Despite its cold fuel rods, Zwentendorf has constantly fueled internal Viennese politics. For 7 years the reigning socialists left no stone unturned in trying to activate the mothballed reactor. They planned a new plebiscite, which they hoped would negate the November 1978 antinuclear power vote and finally make the expensive investment profitable.

During the winter of 1985-86 the nuclear lobby thought that it was about to win its case. The pollsters detected a change of opinion among the population. Concerned primarily about preserving the last of the pristine Danube meadows, waterfalls, and mountain streams, 62 percent of those interviewed indicated a preference for the supposedly environment-friendly nuclear power. The number of pronuclear advocates increased irrespective of party affiliation or socio-economic status. Then Federal Chancellor Fred Sinowitz exulted: "Reason has triumphed--Zwentendorf goes into action."

But the shock wave from Chernobyl hit at the peak of the nuclear euphoria. The barometer of opinion dropped once again. The 62 percent who had been pronuclear sympathizers suddenly became a 77 percent antinuclear majority of voters, whom feelings have remained unchanged. There is absolutely no need for another plebiscite--it would result in an overwhelming confirmation of the "No" vote of 1978.

What to do? To go on keeping old "Zewti" in mothballs could prove very expensive in view of the unpredictable future. After all, its care and maintenance do cost 7 million Swiss francs per year.

Sinowitz and his successor Vranitzky decided on a radical solution. With heavy heart, they advocated scrapping the 770 megawatt plant as quickly as possible and to sell it, including its 494 built-in fuel elements, to the highest bidder.

The Electric Power Consortium could not come up with a better idea. In October the eight members of the Zwentendorf board--all of them representing government-controlled institutions--voted thumbs down for Austria's first and only nuclear power plant. "The funeral is over; let the jolly funeral repast begin!" commented Walter Fremuth, head of 50 percent-owner Verbundgesellschaft, with undisguised sarcasm.

Bechtel Overseas Corp., the worldwide California engineering firm, was given a contract to come up with specific proposals for the most favorable way of selling the reactor by the end of the year. It is estimated that dismantling and shipping the various components will take anywhere from 2 to 3 years.

It is already an established fact that this clearance sale means the government will take a bath. A preliminary evaluation worked out by the Bechtel people eliminates any doubt.

Even the theoretical inventory of all usable components is a disappointment. Their net worth is given as barely 600 million Swiss francs, less than one-fourth of the 2.8 billion that a comparable nuclear reactor costs these days. Part of the reason is that the Zwentendorf's concrete castle contains enough steel for 50,000 automobiles. Its pipe conduits measure more than 60 km and its electric cables would stretch from Vienna to London. Most of the built-in equipment is a total loss, since it either cannot be removed, or, as is the case with the huge pressure tank, is not transportable by either road or rail.

The actual sales negotiations are likely to be even more depressing. One can always dream of a sales price of 600 million Swiss francs, which would be little enough. But even at that, there appear to be no serious customers for nuclear power made in Austria anywhere on earth.

The Chances Are Close to Zero

The chance of an "as is" sale, certainly the more attractive possibility, is about zero. After screening 63 potentially interested states, the Bechtel team could come up with only six potential buyers: Italy, Switzerland, Yugoslavia, Finland, Turkey, and Egypt. But all of them declined. The

reason: Zwentendorf's hot-water reactor is based on 1960's technology and is considered obsolescent.

The only realistic possibility thus appears to be the sale of individual components--the decidedly less favorable method. But here too there are difficulties to be overcome. According to a Bechtel survey of the world market, international demand is limited to 6 percent of the turbine-related components and 42 percent of the mechanical and electronic ones. The large residue is considered to have little more than scrap value.

Nor is there any demand for the carefully sealed fuel rods, which are valued at 130 million Swiss francs in the inventory. The reason for this is that they are tailor-made "first-use" rods, whose initial ignition would not produce sufficient energy to cause a quick nuclear reaction in already operational nuclear power plants. It appears likely that in the end these expensive fuel rods will have to be disassembled, for better or worse, and sold back cheaply to their manufacturer, Kernkraftwerksunion in Ilanau.

The upshot of all this is that the fantastic bargain named "Zwenti" has all the earmarks of a white elephant. If the deal goes through, the net revenue, after deducting dismantling costs, would come to a measly 80 million Swiss francs. Repeat--if it goes through. Since the Bechtel accountants based their estimates on pre-Chernobyl prices, which have since deteriorated considerably, the bitter truth probably lies nearer 40 to 50 million. Be that as it may, the 1.75 billion Swiss francs spent on the construction and mothballing of Zwentendorf must be almost entirely written off in the "total loss" column.

Despite the enormous loss, there will remain an ugly colossus of a building, 110 meters high and 20 meters in depth, consisting of masses of concrete that could easily have served to build 1,500 single-family homes. The cost of having it removed would by far exceed the self-sacrificial tolerance of the Austrian taxpayer.

Dismantling the huge reactor building would cost a minimum of 140 million Swiss francs. In other words, if the facility were to be made to disappear entirely, to be replaced by the formerly existing green meadow, this would not only eliminate the resale value of any marketable built-in components, but would cost an additional 60 to 100 million Swiss francs. This Sleeping Beauty castle, with its 2-meter thick walls of concrete and steel, which has waited in vain for its prince to come, would just about have to be taken down by hand, piece by piece. "That would take about 7 years and 420 man-years of labor," according to a precise estimate by Bechtel project director Walter Peseckas. In any case, too much.

Enjoying Bankruptcy

Fortunately the citizens of the republic on the Danube are eminently adept in dealing elegantly with bankruptcies of all sorts, and even derive some enjoyment from the process. In this particular case, their mastery of handling catastrophes is of enormous benefit to them.

The hard figures accompanying their gentle departure from the nuclear age hardly provoke a headache for the Austrians. Much more effort is being spent in animated discussion about future uses of the nuclear power station ruin. Should it be, as suggested by abstract painter Friedensreich Hundertwasser, topped with a few onion-shaped towers and opened to the public as a museum of human folly? Should it be turned into a permanent hi-tech spectacle? Or into a nuclear war shelter for the government?

Most people agree, however, that the most attractive alternative would be to give up entirely on trying to sell it off, which would hardly be worthwhile anyway. Rather than destroying Zwenti's innards completely, it would make sense to put them together again. This would leave Austria with a truly sensational tourist attraction: the only full-size model of a nuclear power plant in the whole world. All the art collections from the era of the monarchy would finally be joined by a worthy counterpart from republican times.

9273/12913
CSO: 5100/2413

FEDERAL REPUBLIC OF GERMANY

MODERNIZATION OF USSR POWER PLANTS

Contract Reported

AU11542 Paris AFP in English 1526 GMT 11 Jan 87

[Text] Bonn, Jan 11 (AFP) — West Germany is drawing up a five-billion Deutsche mark (2.5-billion-dollar) agreement for modernising Soviet nuclear power stations, which would be one of the biggest accords ever signed between East and West, the daily *Bild* reports in Monday's edition.

The newspaper said that the agreement provides for improving safety standards in Soviet power stations, after the disaster at Chernobyl last April.

The United States, the newspaper said, is not enthusiastic about the agreement, fearing that it could give the Soviet Union access to the latest technology.

As the Soviet Union cannot self-finance the project, *Bild* said, West Germany plans to supply Moscow with two billion marks (a billion dollars) in long-term credits.

Moscow in turn would supply West Germany with two billion marks (a billion dollars) worth of uranium, and the European Economic Community would grant the Soviet Union a billion marks (500 million dollars) in credits. *Bild* said.

Official Comments

LD111657 Hamburg DPA in German 1553 GMT 11 Jan 87

[Text] Bonn (DPA) [no date as received] — *Bild* reports that the Federal Government is planning to sign a DM5 billion contract with the Soviet Union to modernize Soviet nuclear power plants with the participation of the EC. This technology agreement is being prepared in strict secrecy, the paper reports in its Monday edition. It says that Foreign Minister Hans-Dietrich Genscher (FDP) advocated deliveries of the latest technology against apparent U.S. unwillingness.

In Bonn Werner Gries, Science Ministry spokesman, said: "We are unaware of it." He said this in reply to an inquiry. [DPA editorial note: "The spokesman of the Science Ministry made it clear that he was not denying the newspaper report but had merely pointed out that the matter was not known to the ministry."]

Talks with the Soviet Union have stagnated since the failure to sign a technology agreement last November when Federal Science Minister Heinz Reisenhuber (CDU), who was to have gone to Moscow to sign the agreement, was not invited as a result of Federal Chancellor Helmut Kohl comparing Gorbachev with Goebbels in the U.S. *Newsweek* magazine.

According to *Bild*, the Soviet Union is to receive a long-term loan of DM2 billion from Bonn and another loan of DM1 billion from the EC for reequipping of 48 nuclear power plants. In addition, the Soviet Union is to supply uranium worth DM2 billion to the Federal Republic.

Spokesman Confirms Talks With USSR

LD121517 Hamburg DPA in German 1445 GMT 12 Jan 87

[Excerpt] Bonn 12 Jan (DPA) — According to the government spokesman Friedhelm Ost, FRG companies, together with banks, are holding talks with authorities in Moscow about a modernization of Soviet nuclear power plants. Speaking to the press on Monday, Ost did not give any more precise details on the current state of the contacts and the identity of the German parties to the talks. However, he did refer to the willingness to cooperate in the improvement of nuclear safety often expressed by Chancellor Helmut Kohl after the Soviet reactor disaster at Chernobyl.

According to the Foreign Ministry spokesman Juergen Chrobog, there are no specific projects as yet. Hence, there could be no question of alleged American doubts about the supply of the latest technology.

In its Monday edition, *Bild* had reported that the FRG Government was planning a DM5 billion contract with the Soviet Union for the modernization of its nuclear power plants, in which the EEC would also be a partner. According to the report, Foreign Minister Hans-Dietrich Genscher spoke in favor of the supply of the most modern technology, against which the United States had apparently expressed doubts. [passage omitted]

Further on Agreement

DW131042 Hamburg BILD In German 13 Jan 87 p 2

[Report by "TEP": "Safer Soviet Nuclear Power Plants: Banks Negotiating"]

[Text] The Federal Government confirmed that German firms are supposed to make nuclear power plants in the Soviet Union

safer. Government spokesman Ost: "I know that firms and banks are already negotiating it with the Soviet Union." *Bild* reports that the Soviets want to "modernize" their 48 nuclear power plants. Cost: roughly DM5 billion.

FPD Secretary General Haussmann: "I welcome this plan for more reactor safety in the Soviet Union."

"It involves our safety. We must not limit environmental protection to national borders; we must act on a worldwide level."

Professor Adolf Birkhofer, chairman of the Reactor Safety Commission, explains possible measures: "We can equip Soviet nuclear power plants with modern pressure and neutron instruments and with automatic cut off equipment for an emergency. It is also possible to supply safety containers and safety valves for nuclear reactors of a more modern type."

KWU, Science Minister Comment on Deals

LD122246 Hamburg DPA in German 1707 GMT 12 Jan 87

[Text] Erlangen, 12 Jan (DPA) — Apparently no decisions have yet been taken concerning a nuclear power plant deal between the Federal Republic and the Soviet Union. Kraftwerk Union AG (KWU), a Siemens subsidiary, said today that one could not know at present whether, and to what extent, the Soviet Union would have recourse to Western technology in enhancing the safety of its nuclear power plants. In reply to an inquiry, KWU in Erlangen said that "we are under the impression" that the relevant decisions are at a preparatory stage.

KWU said that since the Chernobyl reactor disaster it had intensified its contacts with the Soviet authorities to sound out possibilities for winning orders in the field of safety modernization and maintenance of nuclear power plants in the USSR. In some fields it has made offers, but so far no orders have materialized.

KWU said it is interested in winning such orders from the Soviet Union and other socialist countries. It has the relevant experience with Soviet reactor technology from the projects of the Finnish nuclear power plant at Loviisa. KWU adapted Loviisa's two Soviet-built reactors to Western reactor technology and supplied control equipment.

KWU would welcome any Federal Government support for such industrial cooperation. But no talks have yet taken place with the Federal Government on finance and other export questions since one would have to await the decisions of the Soviet side.

In a conversation with DPA in Hamburg today, Heinz Riesenhuber, federal science minister, expressed the view that Moscow is still interested in principle in concluding an agreement on technological cooperation. He said the cancellation of his visit to Moscow was not due to a lack of Soviet interest. He confirmed that reactor safety technology formed part of the agreement which is ready for signing. The minister said: "It is now up to the Soviet Union. I cannot invite myself to visit Moscow."

Soviet Envoy Confirms Contacts

LD141946 Hamburg DPA in German 1652 GMT 14 Jan 87

[Text] Bonn, 14 Jan (DPA)--The Soviet ambassador to Bonn, Yuliy Kvitsinskiy, confirmed initial contacts on matters of reactor safety. But they have been so vague so far that one cannot speak of negotiations, he added.

Companies Deny Negotiations

LD141945 Hamburg DPA in German 1641 GMT 14 Jan 87

[Text] Mannheim/Erlangen, 14 Jan (DPA/VWD) — The West German nuclear power industry is unaware that the Federal Republic is negotiating with Moscow to build two high temperature reactors in the Soviet Union. A spokesman of Hochtemperaturreaktoren [high temperature reactor construction] which forms part of the BBC group [Brown, Boveri & Cie], the only West German company to build high temperature reactors, said that it knows nothing about it and has not tendered.

Bild newspaper (Thursday's edition) reports that secret preparatory negotiations are taking place for the biggest industrial project in the history of both countries, worth DM6 billion. It concerns the construction of two high temperature reactors. The BBC spokesman commented that, while the Soviet Union is interested in this technology, no negotiations have taken place. Interatom, a KWU subsidiary, which has developed low high temperature reactor modules, is unaware of the project.

The Federal Economic Affairs Ministry and the Science Department said, regarding the *Bild* report, that German firms have made contacts and the Soviet Union has shown interest but concrete talks have not taken place. Experts said that real negotiations have not taken place. Nothing is definite, it was said.

On Monday a spokesman denied a *Bild* report that the Federal Government, with EC participation, is planning a DM6 billion contract to modernize Soviet nuclear power plants. Juergen Chrobog, the Bonn Foreign Ministry spokesman, commented that there are no concrete projects.

/9274
CSO 5100/2420

SPAIN

GARONA NUCLEAR WASTE DEPOSITORY TERMED INADEQUATE

Madrid YA in Spanish 27 Nov 86 p 38

[Text] The Santa Maria de Garona (Burgos) nuclear power plant does not have sufficient capacity to store the wastes it will generate in the future, because a large percentage of the "interim storage facility" is already filled. This charge was made by ADENAT [Association for the Defense of Nature], along with other groups in Castilla-Leon and La Rioja.

This plant generated 713 drums of solid radioactive wastes in the first 6 months of 1986 (data obtained from the report which the CSN [Nuclear Safety Council] submitted to congress, covering the first half of 1986). This means that the number of drums accumulated since the plant started up to the end of June 1986 is 7,207. These drums are located in the single temporary storage facility at the site, called "interim storage."

The capacity of Garona's storage facility is 7,676 drums, so the Nuclear Safety Council, according to the terms of the provisional operating permit (PEP-85), last year required the plant's management to submit a plan designed to increase its storage capacity, so that the wastes which are expected to be generated in the plant in coming years can be stored there. The first response the CSN received was that a more rapid distribution of the drums would boost the storage capacity from 7,676 to 8,000 units. This is a totally inadequate solution, as 7,207 drums are already stored there, and 713 were produced in just the first half of 1986. The problem is actually even worse, as the transitional storage facility is also being used to store sections of pipe and components that have been withdrawn from use, as a result of modifications made in the recirculation system.

7679

CSO: 5100/2415

TURKEY

MEASUREMENT OF RADIATION LEVEL IN TURKISH TEA DISCUSSED

Level Found in Munich

Istanbul MILLIYET in Turkish 22 Nov 86 pp 1, 8

[Mehmet Aktan report from Munich]

[Text] Following the speculation in Turkish hazelnuts in European countries, attention has now been focused on Turkish tea. The Radiation Measurement Center in Berlin (Strahlenmessstelle), announcing the results of recent investigations it has carried out on behalf of the Berlin Consumer Protection Center, has disclosed that it has detected a large amount of radiation in Turkish tea. According to the announcement made by Mr Roemer of the Berlin Consumer Protection Center, while little radiation was found in one sample of Turkish tea, 24,840 bekerels of radiation per kilogram of dry tea leaves and 134 kasium [word as published] (a total of 34,985 bekerels) was detected in a second test.

It has been determined that if 16 grams of this tea is boiled in a liter water, the radiation level in the beverage drops to 370.

Istanbul Radiation-Free Report

Istanbul MILLIYET in Turkish 29 Sep 86 p 8

[Article by Mete Akyol: "Tea Gets Clean Bill of Health"]

[Text] Oh, goodness, I went to Rize in the hope of bringing you glad tidings.... And all the while I did not know that it was somehow I who was bringing good luck to Rize.

I said to Yilmaz Telatar, director general of Cay-Kur [tea producers organization] in Rize: "Well, the disaster called radiation has brought disgrace and scorn to hazelnuts; has it affected the tea crop?" Just then, the telephone rang.

"Hello.... You don't say?.... May your tongue be blessed a thousand times.... A thousand thanks to God.... God has smiled down both on us and the people....

The director general put down the phone, which he had lifted with apprehension but which had brought cheer to him, and swung his chair around with even greater cheer to face me: "The Almighty moves in strange ways; the answer to your question came right on cue, from Cekmece in Istanbul. Now you can spread the good news any way you like...."

All right, I will let you have the good news straight from the horse's mouth. I will just put down what the director general himself said to me, let him do the talking and give you the glad tidings himself:

"Our tea has been given a clean bill of health. This report has just come in by telephone.... Not an iota of radiation has been found in our tea.... Our nation can drink its tea with complete reassurance."

After the flurry of reports to the effect that "radiation had rained down on the eastern Black Sea region," we had been drinking our tea with hands trembling with apprehension, wondering whether it had been touched by radiation or not. Now, in the office of the director general of Cay-Kur, he and I drank our tea with complete reassurance once again.

Let me repeat the words that the director general addressed to me in offering the tea, with the same generosity: "The anxious days are over. Do, please, have your tea; now you can drink it with complete reassurance.... It has been given a clean bill of health...." Mr Telatar said that at the request of the Turkish Nuclear Energy Research Commission they sent a quantity of both dried and fresh tea leaves to the Nuclear Research and Training Center at Cekmece about a month ago.

He added: "Naturally, I have no idea what they did with these samples. However, it appears that these samples did not prove suitable because they asked us, some 15 days ago, for individual samples from various areas in our region."

The director general explained that he had samples of both dried and fresh tea leaves brought in from every locality where Cay-Kur has a factory and from every tea-growing area in Rize and around it.

"We began with samples from the farthest areas, from Kemalpasa near to the border, Pazar and Ardesen on the coast, and then moved on to higher ground. We obtained samples from the Cayeli heights and from Buyukkoy as well. Then we went down to the coast again, had samples gathered from Zihinderin, and moved up to higher ground once again, to Selimiye and Kalkandere... Then we turned west...and obtained samples from Hayrat, Arakli, and Tirebolu; both fresh samples and dry ones.... We labelled these one by one and sent them off to the Cekmece Nuclear Research Center."

Mr Telatar told me that ever since he had both fresh and dry tea-leaf samples collected from all areas where tea is grown or where there are tea-processing factories, whether on the coast or inland, and had the samples sent to Cekmece, he had been praying almost daily, up to a minute or two before I had entered his office, saying "O my exalted God, smile down on our establishment as well as on our whole nation.... Grant that our tea may receive a clean bill of health."

When my question--"Is your tea safe?"--was immediately followed by the telephone message of good news from Cekmece--"You have a clean bill of health"--the director general thought the good news was a bit of good luck that I had brought with me.

He said: "One cannot imagine the Turkish nation going without tea. Where would we be if, God protect us all, we had a radiation problem with tea--in a country where every citizen drinks five or six glasses of tea a day?"

I asked the director general if he had obtained this figure from the Statistics Institute head office. He said he had calculated it himself by the "the proof of the pudding is in the eating" method:

"We know what the country's consumption of tea is because we are both the producer and distributor of it. We also know the population of our country.... If you divide the amount consumed by the number of people in the country, then you get the correct figure automatically."

According to Cay-Kur's figures, 120,000 tons of tea are produced in Turkey per year. And, as the population of our country is 50 million....

"Just a minute," I said, excusing myself.... Umm.... Somehow, dividing 120,000 tons by 50 million people resisted my efforts, hard as I tried.

I said: "I am afraid I have not managed to do these sums, Mr Director General. Can you explain how you reached the conclusion that every citizen drinks five or six glasses of tea per day?"

The director general treated me to a lesson in mathematics. He said: "A 100-gram packet produces 60 to 70 glasses of tea. So, 1,000 grams, or 1 kilogram, of tea produces some 600-700 glasses of tea. And 120,000 tons are equal to 120 million kilograms. Divide this by 50 million and you get something like 2.2 [figures as published]. That is, we are consuming 2 kilos and 200 grams of tea per citizen per year. Taking this figure together with the fact that a 100-gram packet will make 60 to 70 glasses of tea, we arrive at the conclusion that each citizen has 5-6 glasses of tea per day." According to these calculations by Director General Yilmaz Telatar, all 50 million members of the Turkish nation drink 5-6 glasses a day. This means that everybody likes tea in Turkey.

It may be that radiation alone does not like tea.... It looks as if radiation so dislikes tea--which grows side by side on the same land with hazelnuts--that on its mad rush down from the clouds it suddenly slams on the brakes--like an Istanbul driver at the traffic light on red--and changes course to stop falling on the tea plantations, and unloads its full fury on the hazelnuts instead.

And thus tea is saved from radiation.

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